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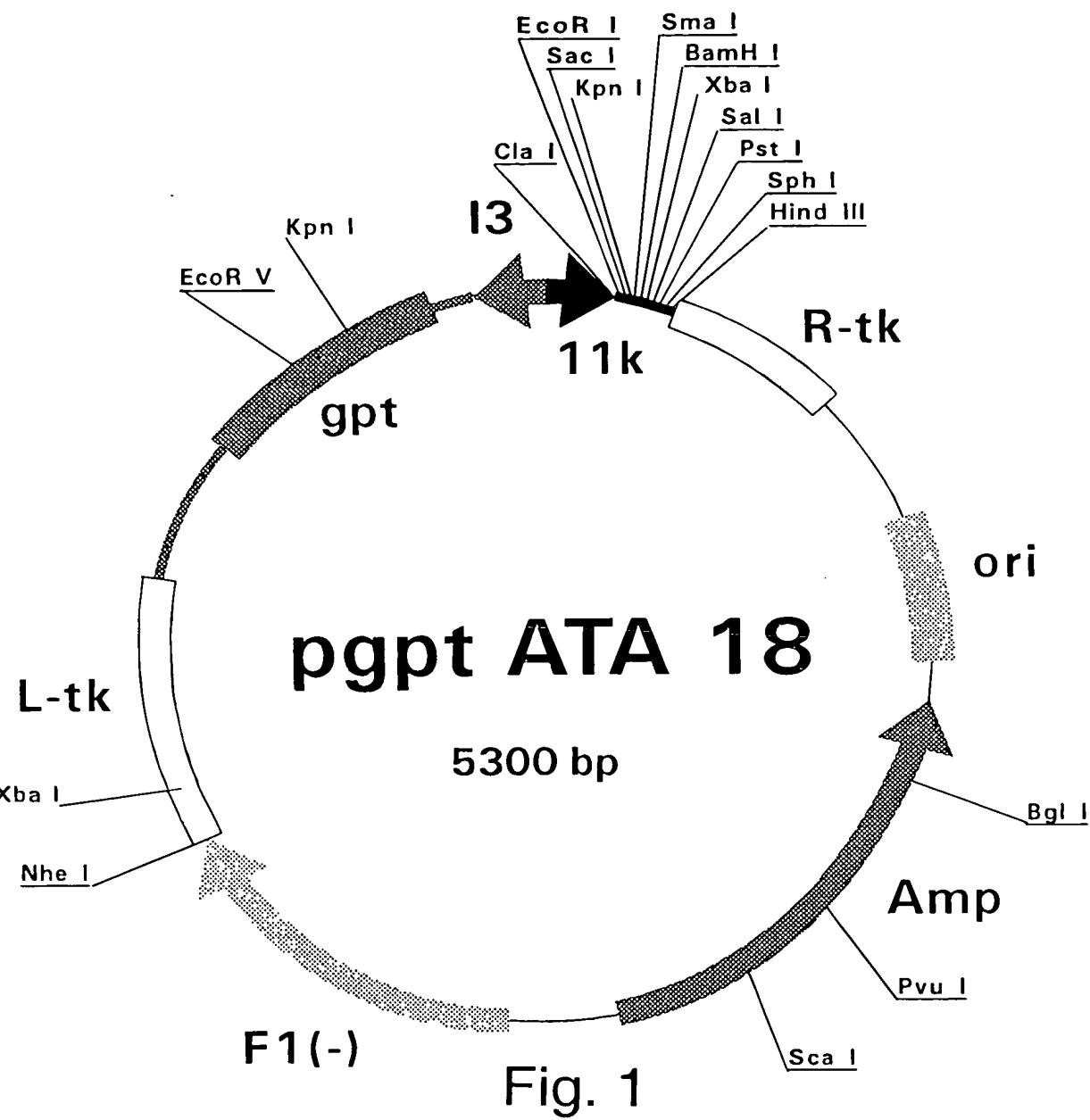
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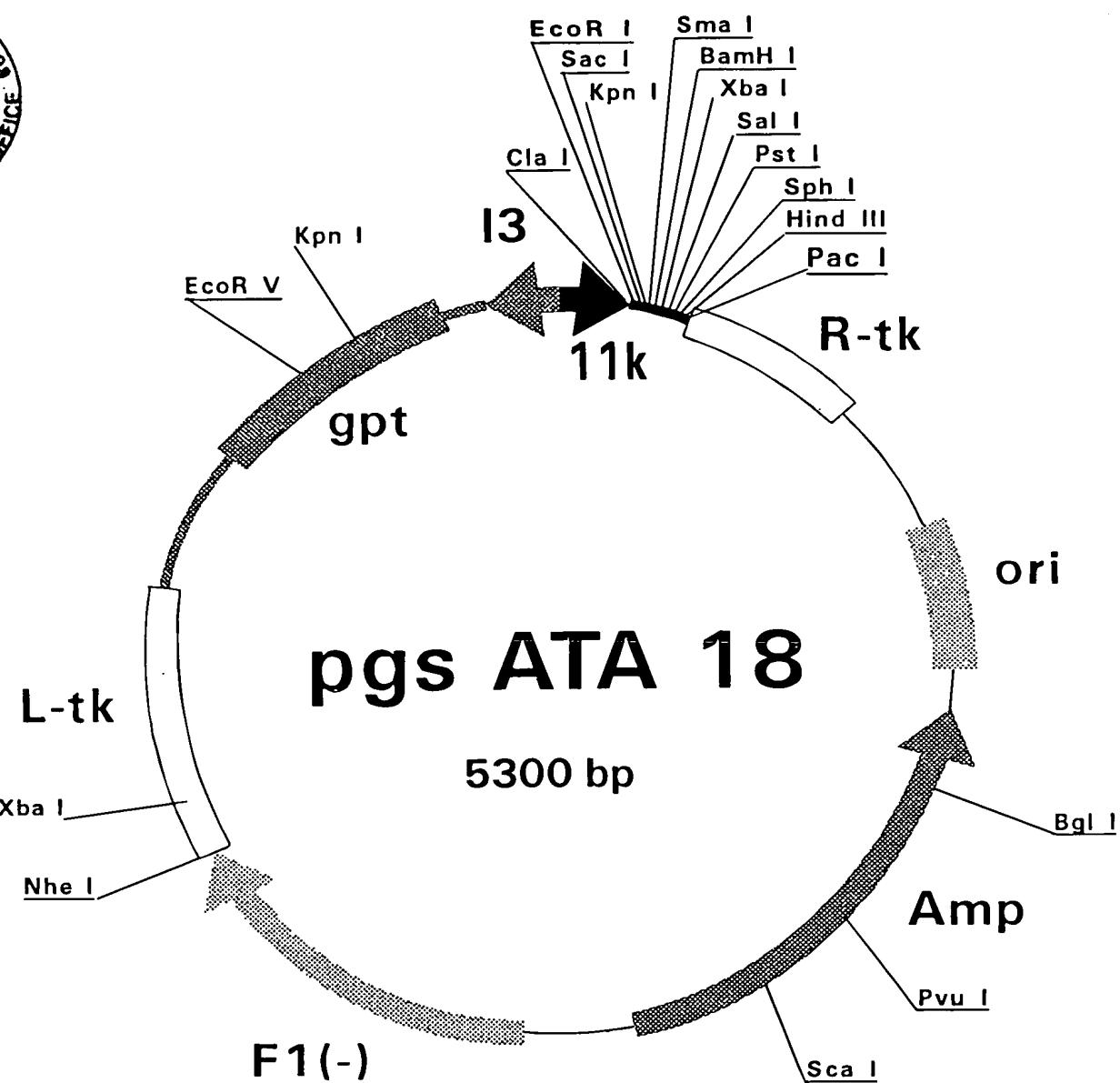


Fig. 2

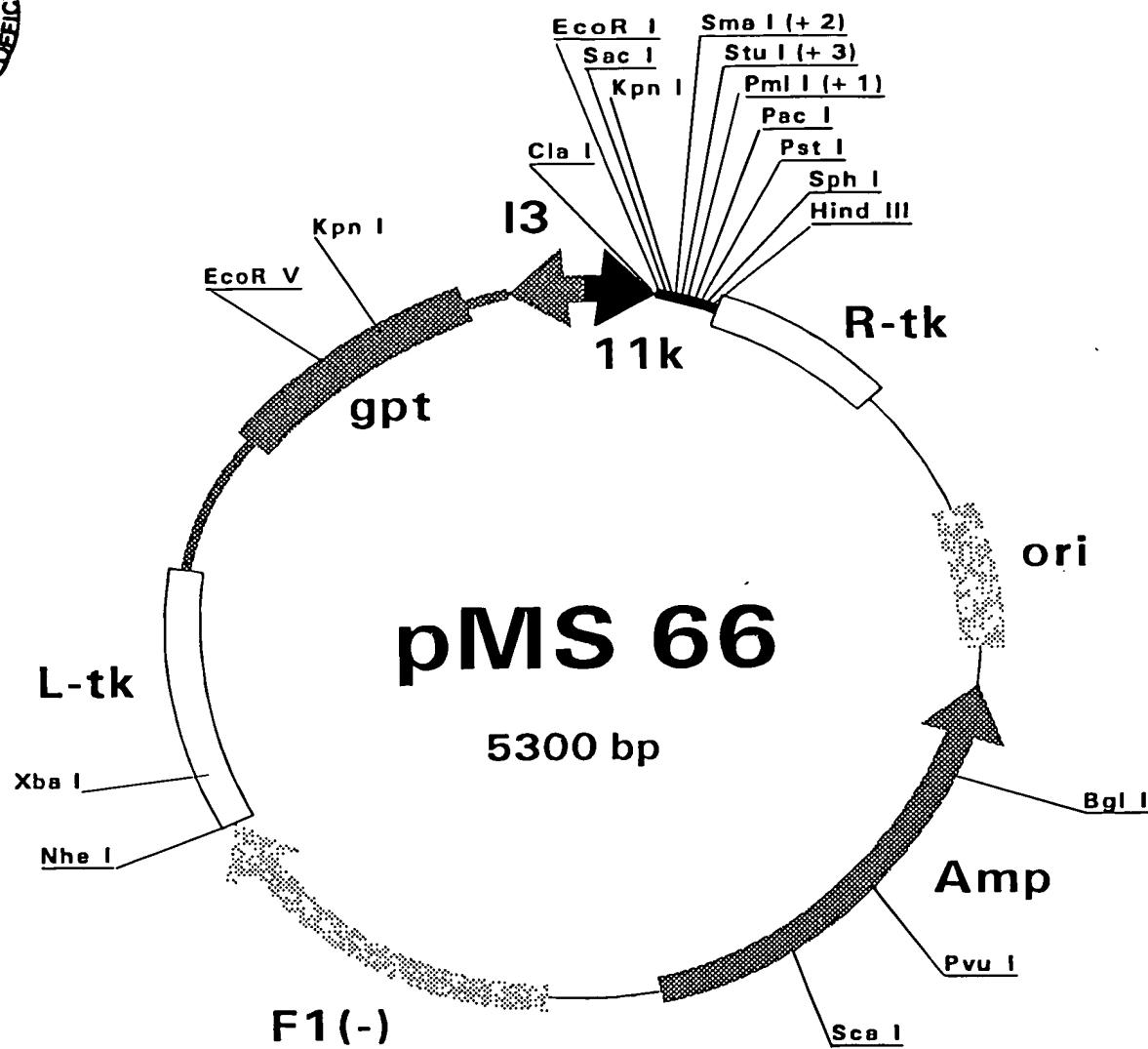


Fig. 3

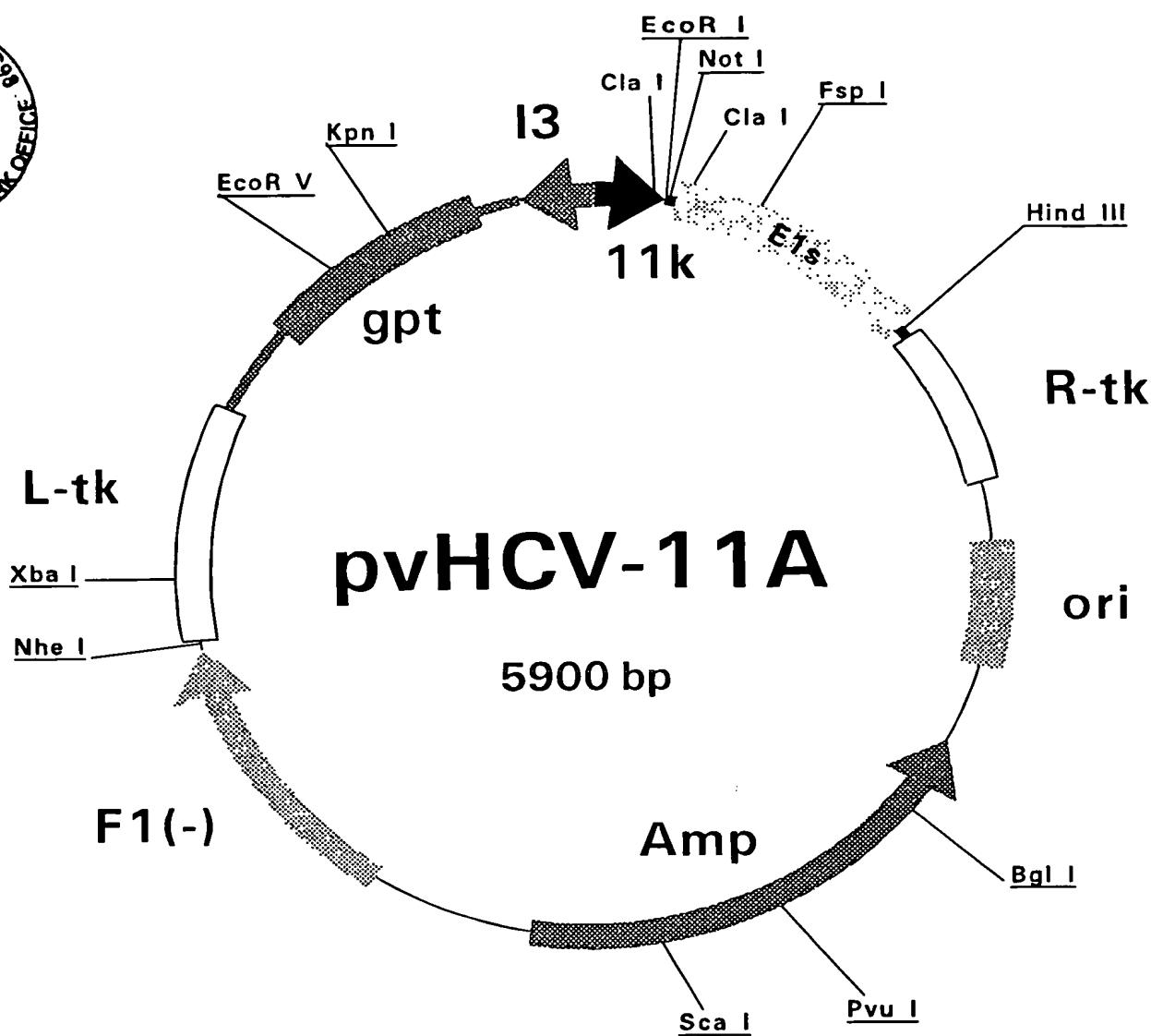
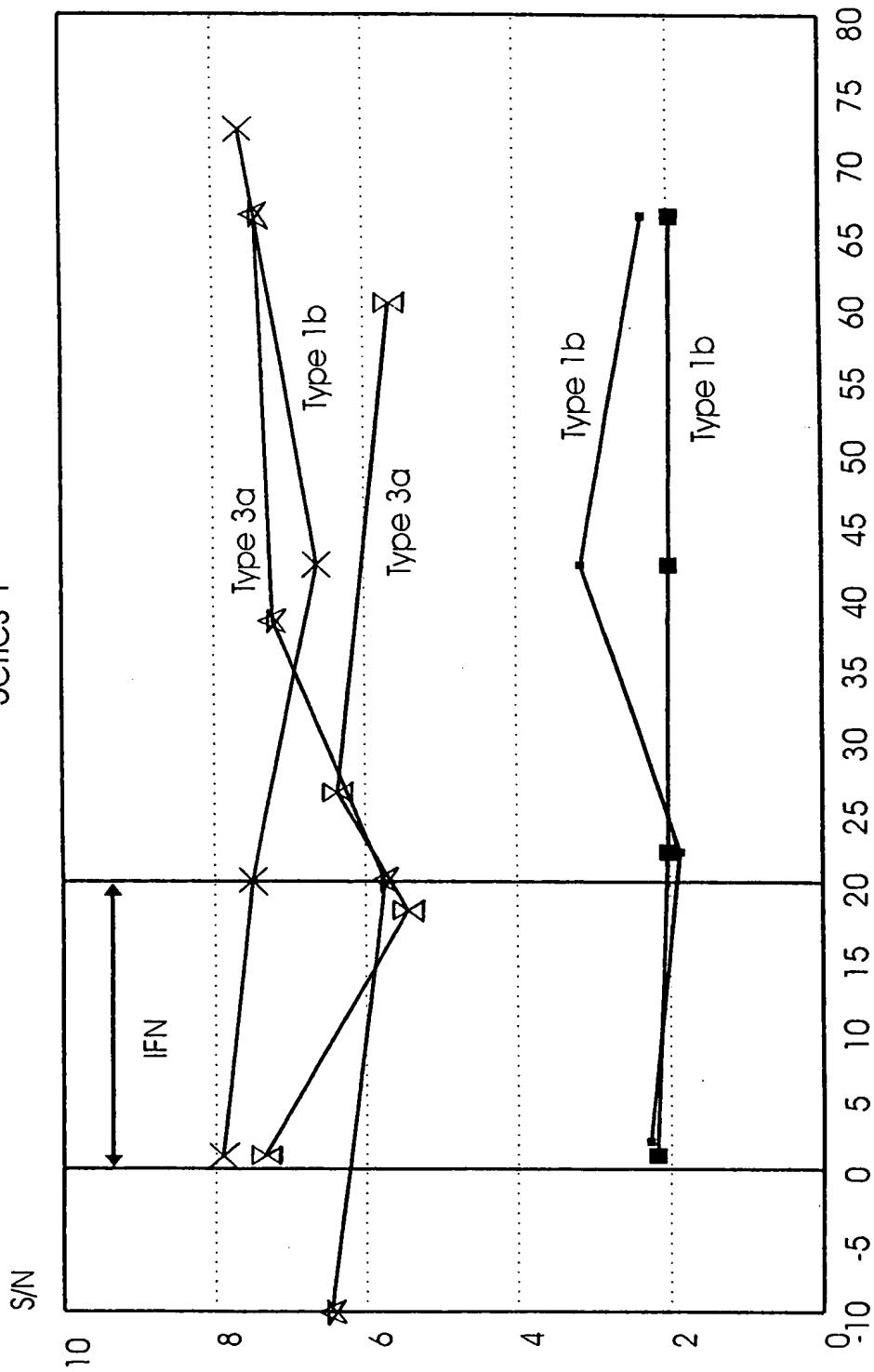


Fig. 4



Anti-E1 levels in NON-responders to IFN treatment

Series 1



weeks after start of treatment

Fig. 5



Anti-E1 levels in RESPONDERS to IFN treatment

SERIES 1

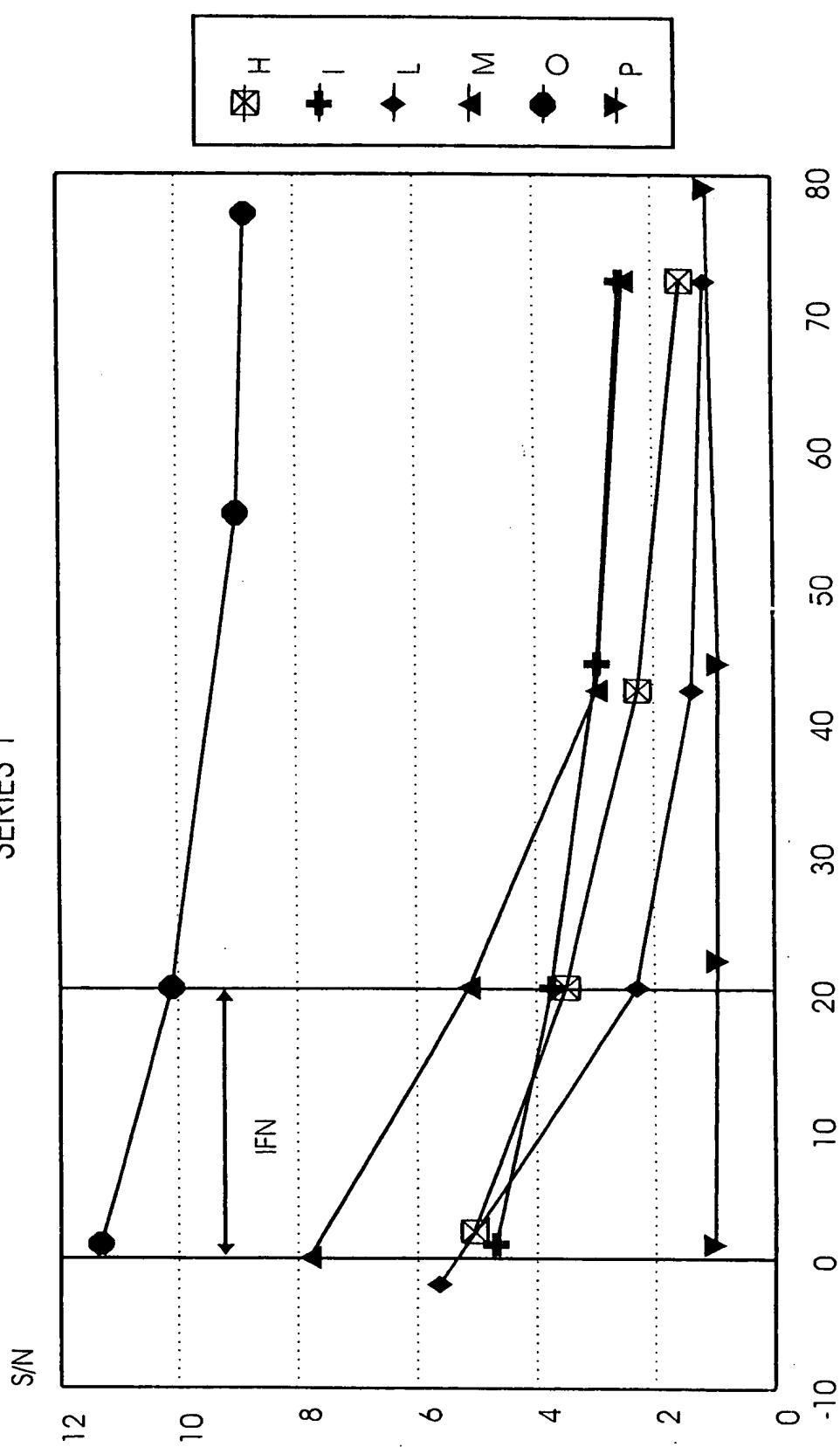
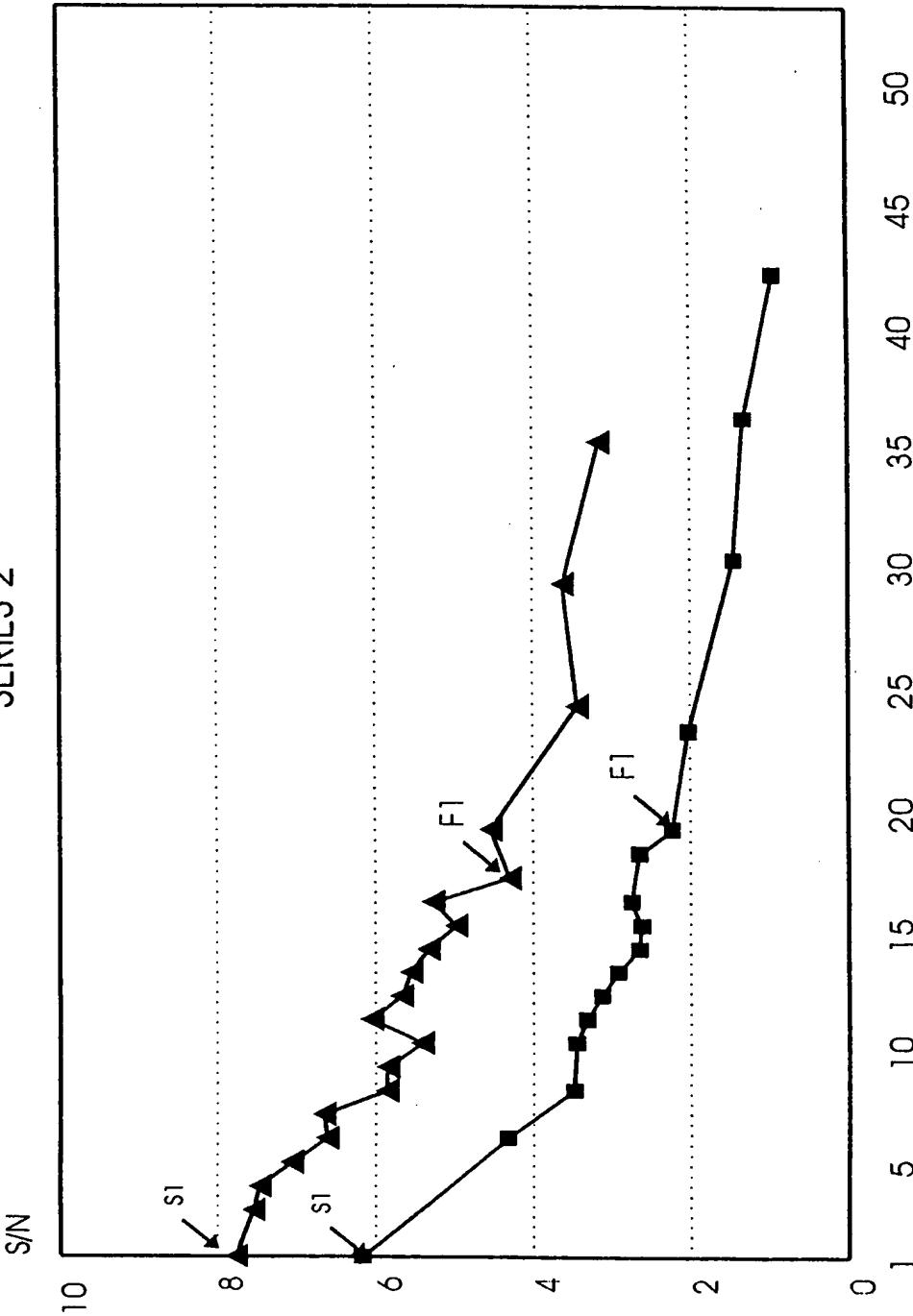


Fig. 6
weeks after start of treatment

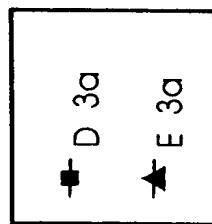
Anti-E1 levels in patients with COMPLETE response to IFN

SERIES 2



months after start of treatment

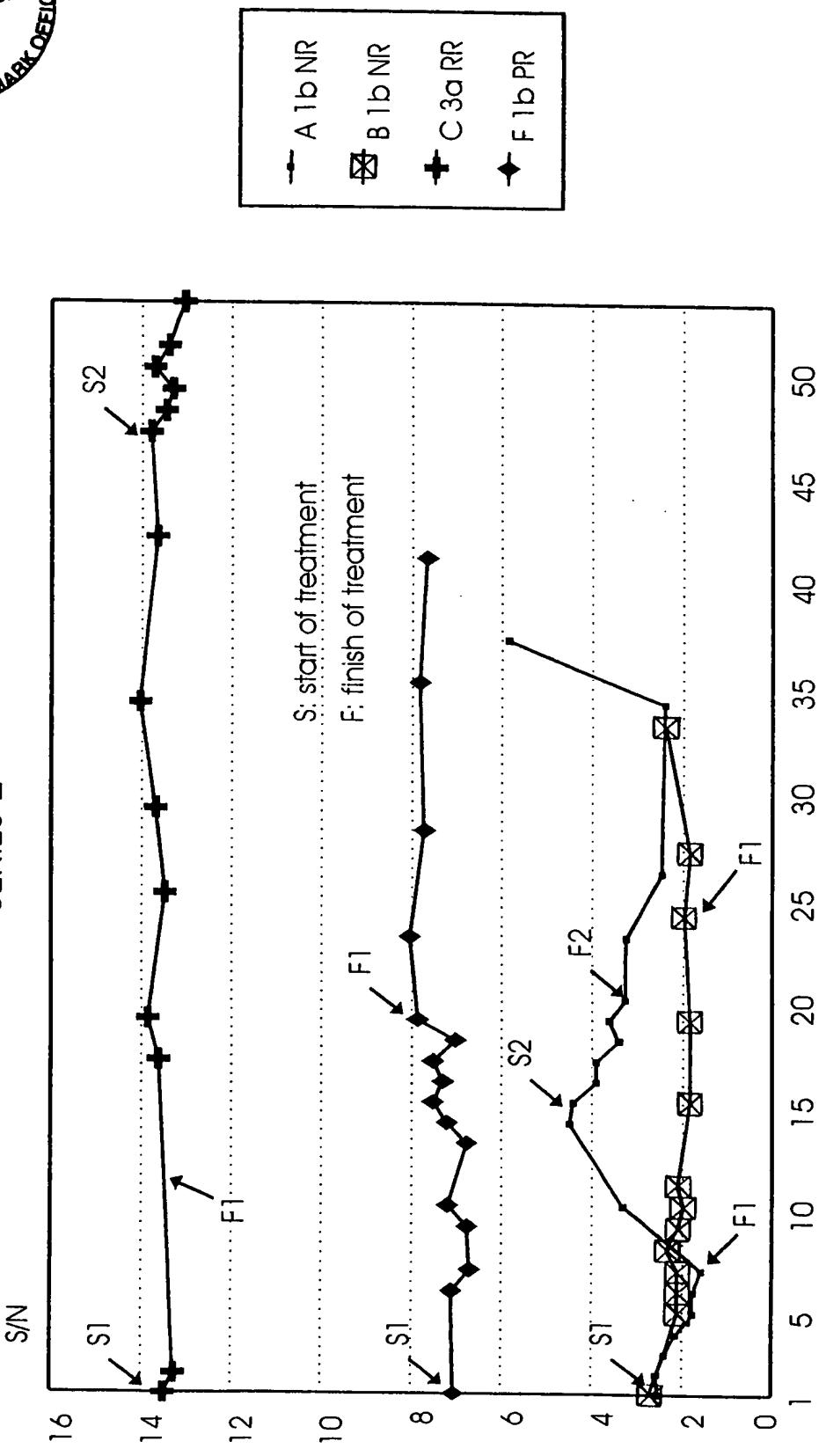
Fig. 7





Anti-E1 levels in INCOMPLETE responders to IFN treatment

SERIES 2

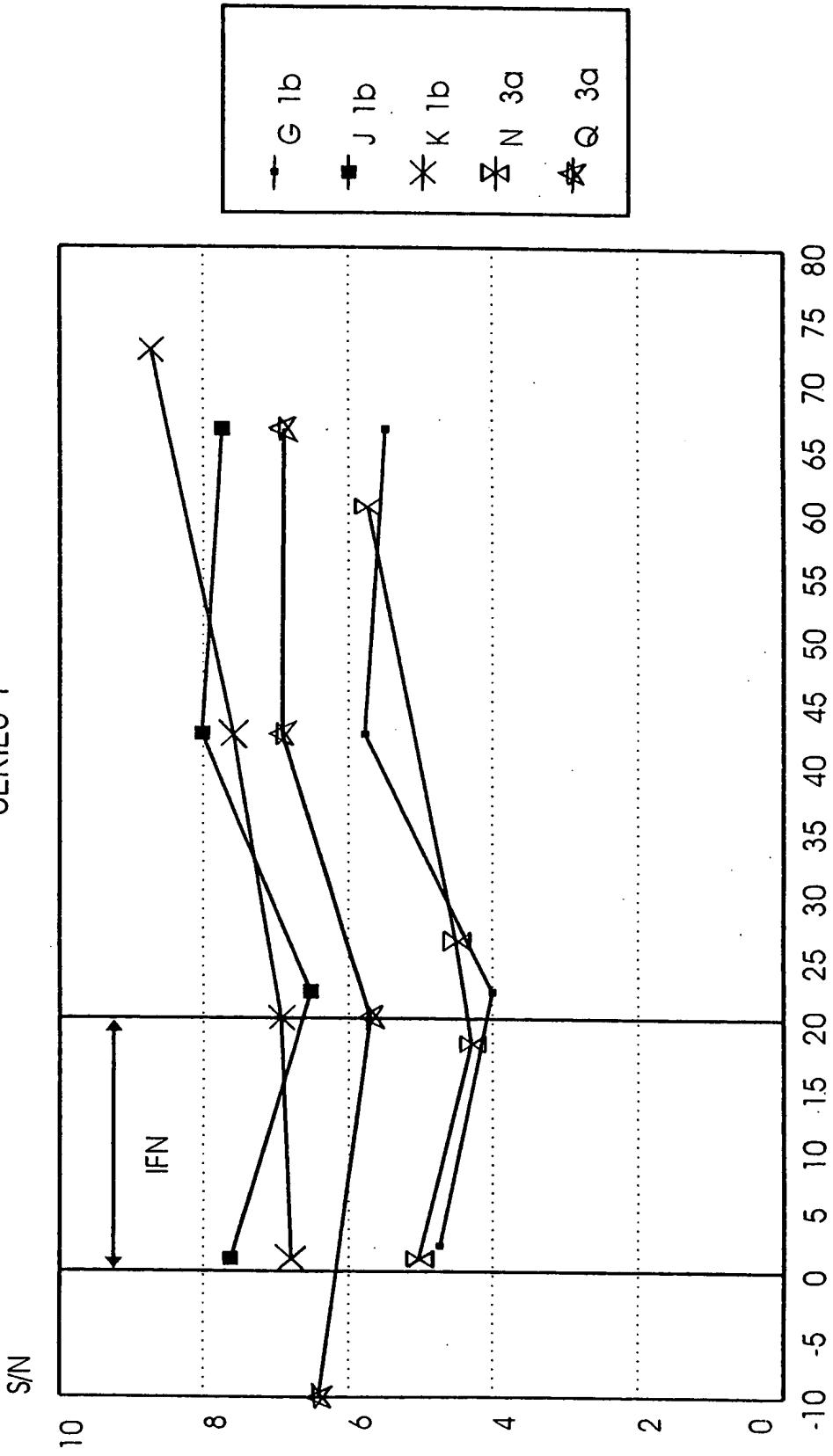


months after start of treatment

Fig. 8

Anti-E2 levels in NON-RESPONDERS to IFN treatment

SERIES 1



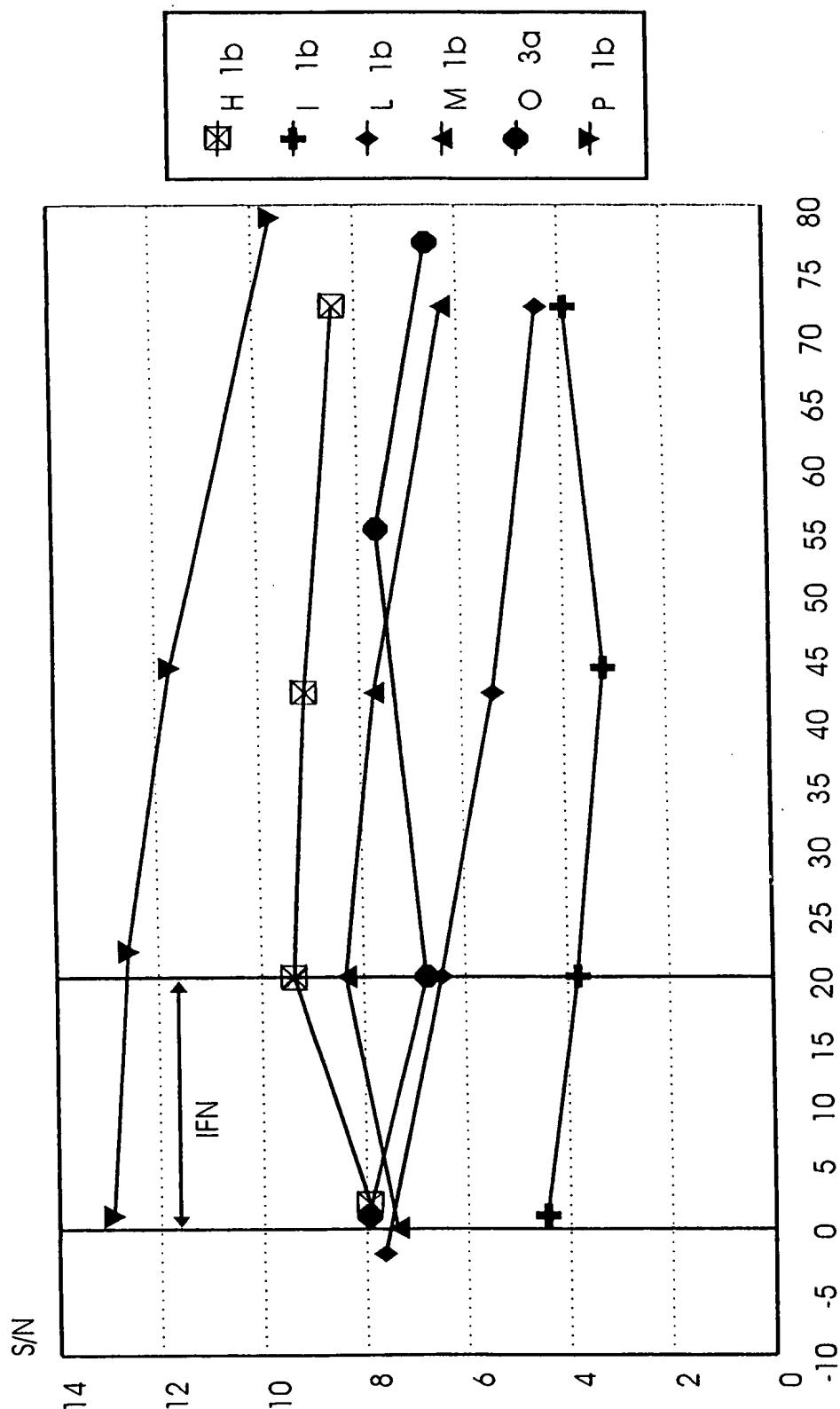
weeks after start of treatment

Fig. 9



Anti-E2 levels in RESPONDERS to IFN treatment

SERIES 1



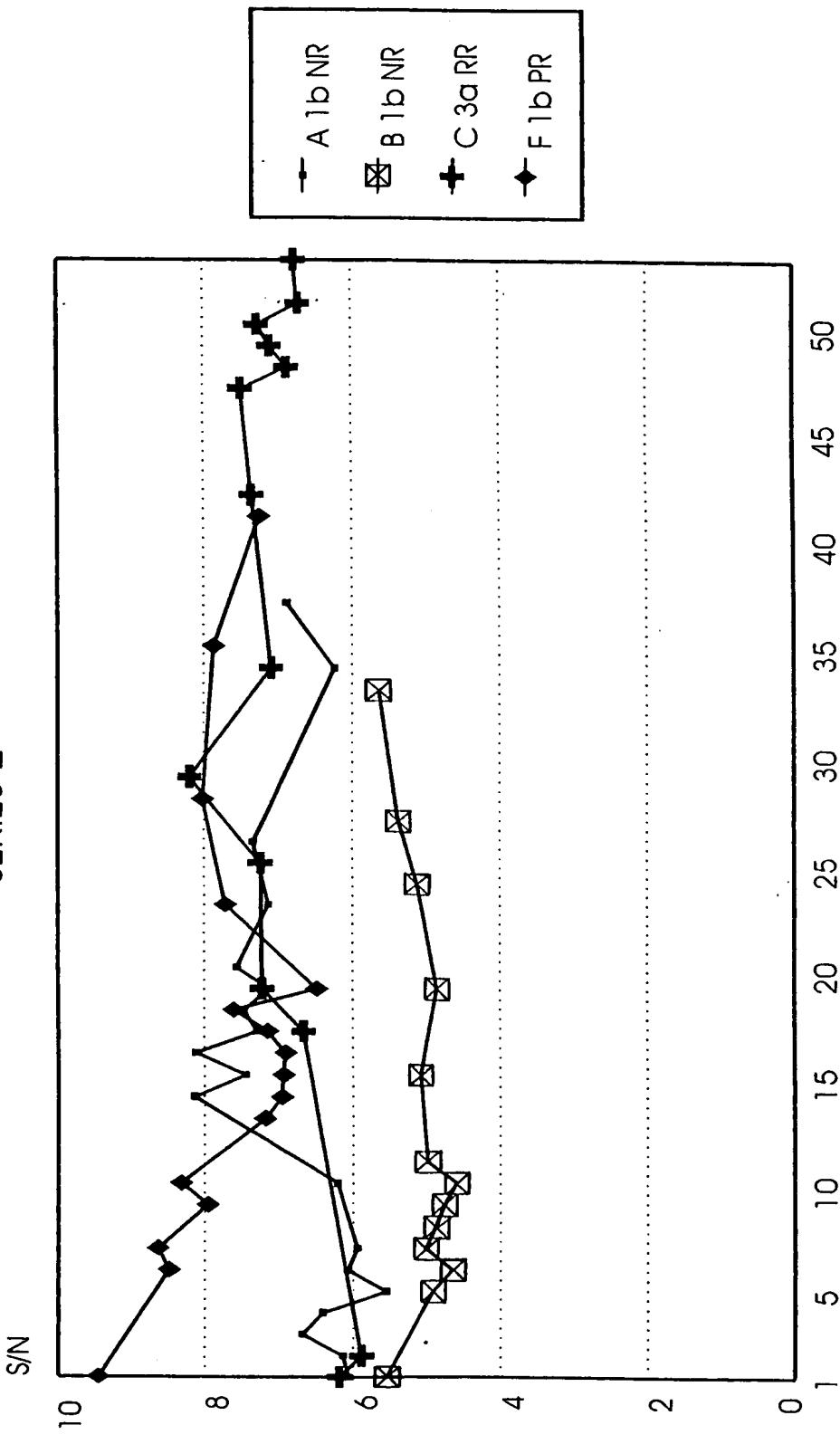
weeks after start of treatment

Fig. 10



Anti-E2 levels in INCOMPLETE responders to IFN treatment

SERIES 2



months after start of treatment

Fig. 11



Anti-E2 levels in COMPLETE responders to IFN treatment

SERIES 2

S/N

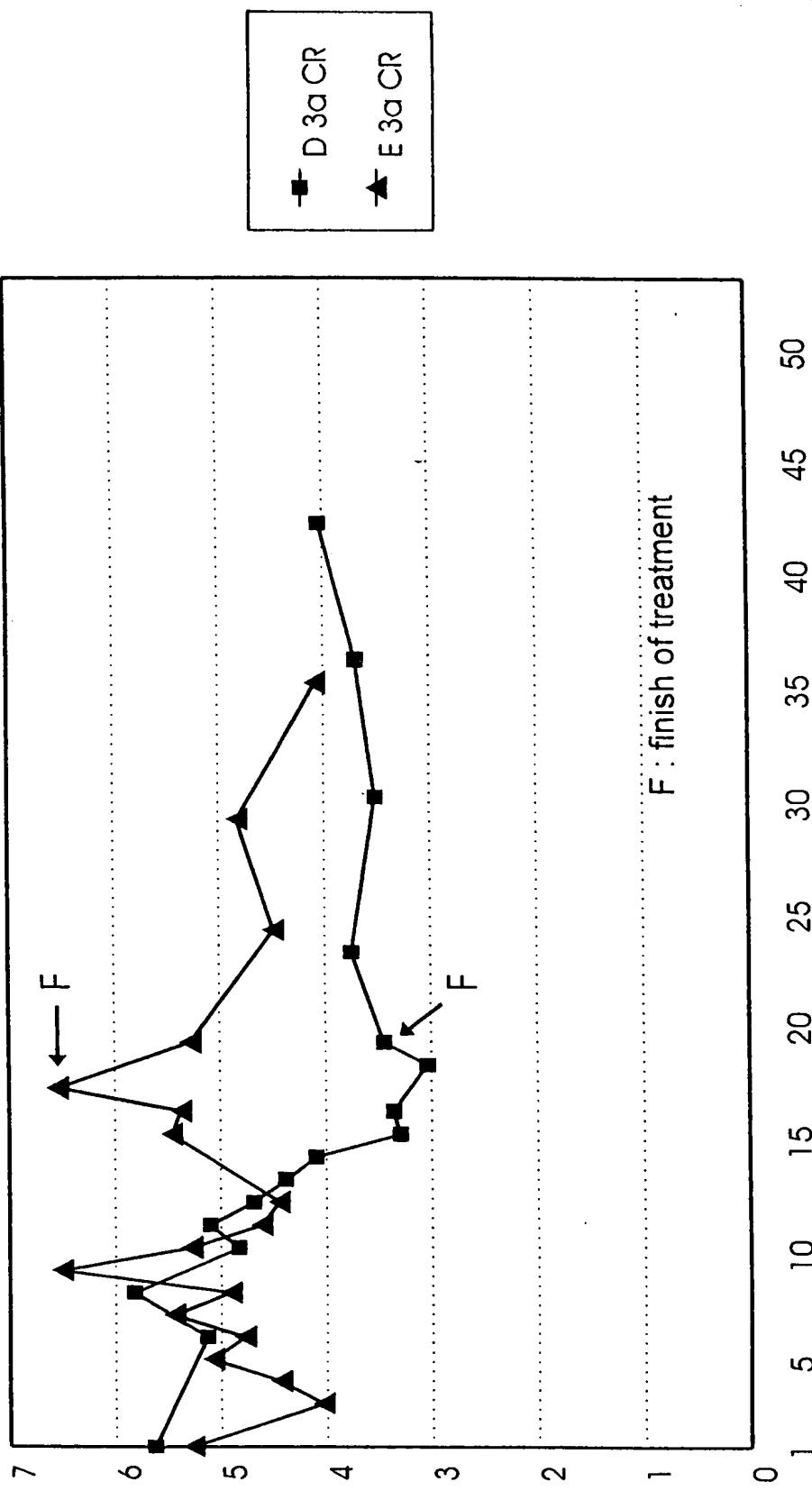


Fig. 12



Human anti-E1 reactivity competed with peptides

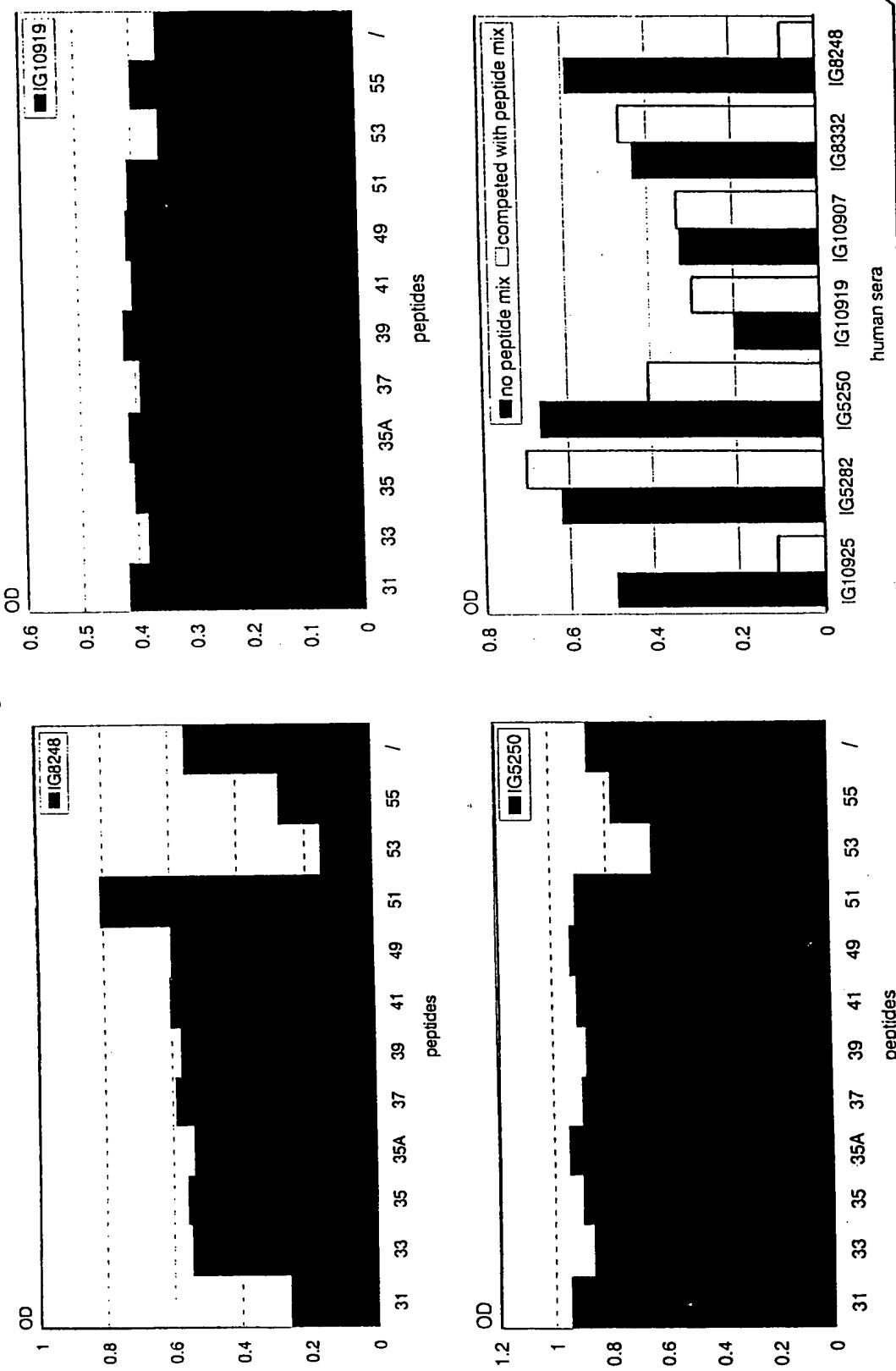


Fig. 13

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Competition of reactivity of anti-E1 Mabs with peptides

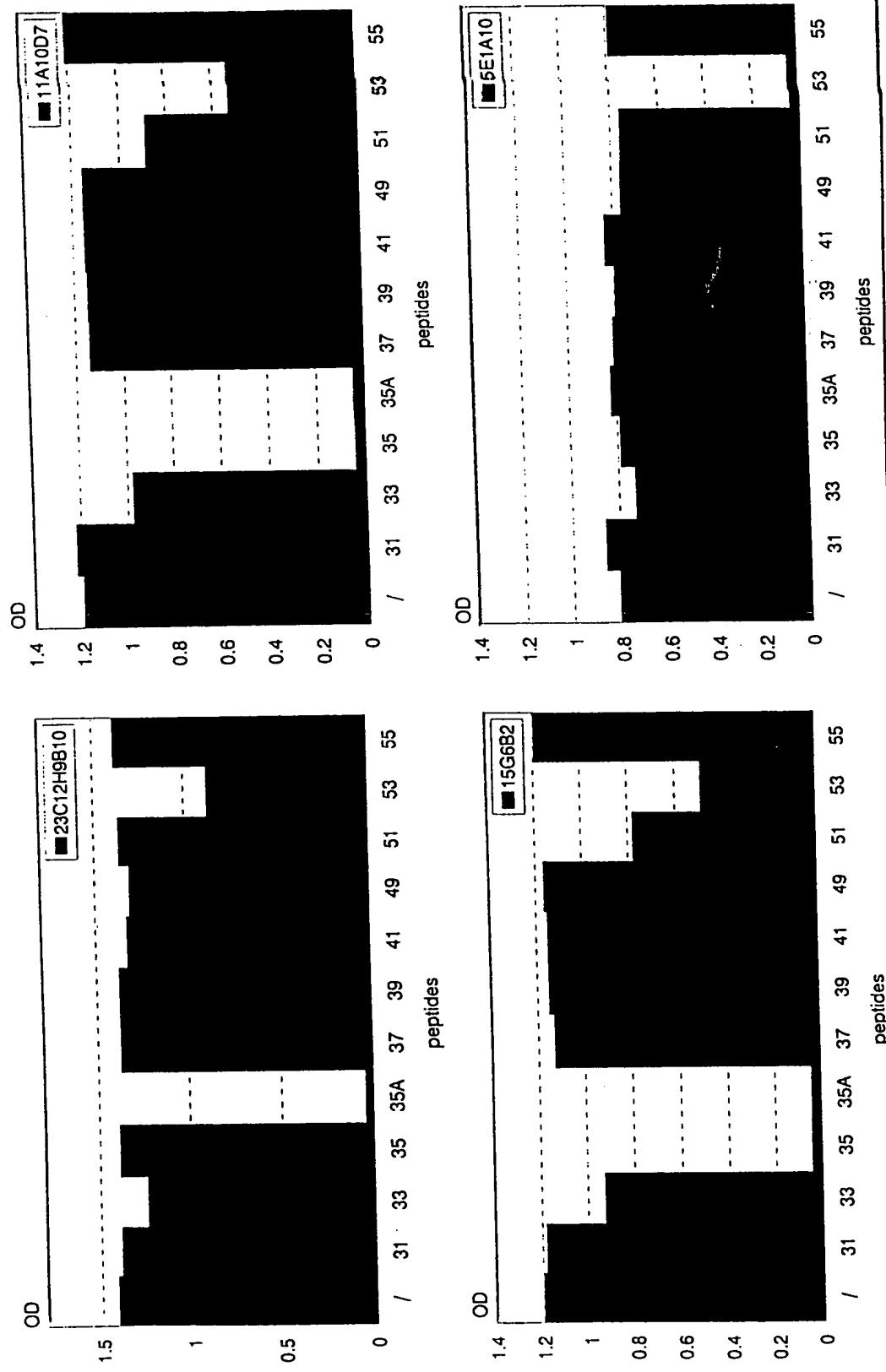
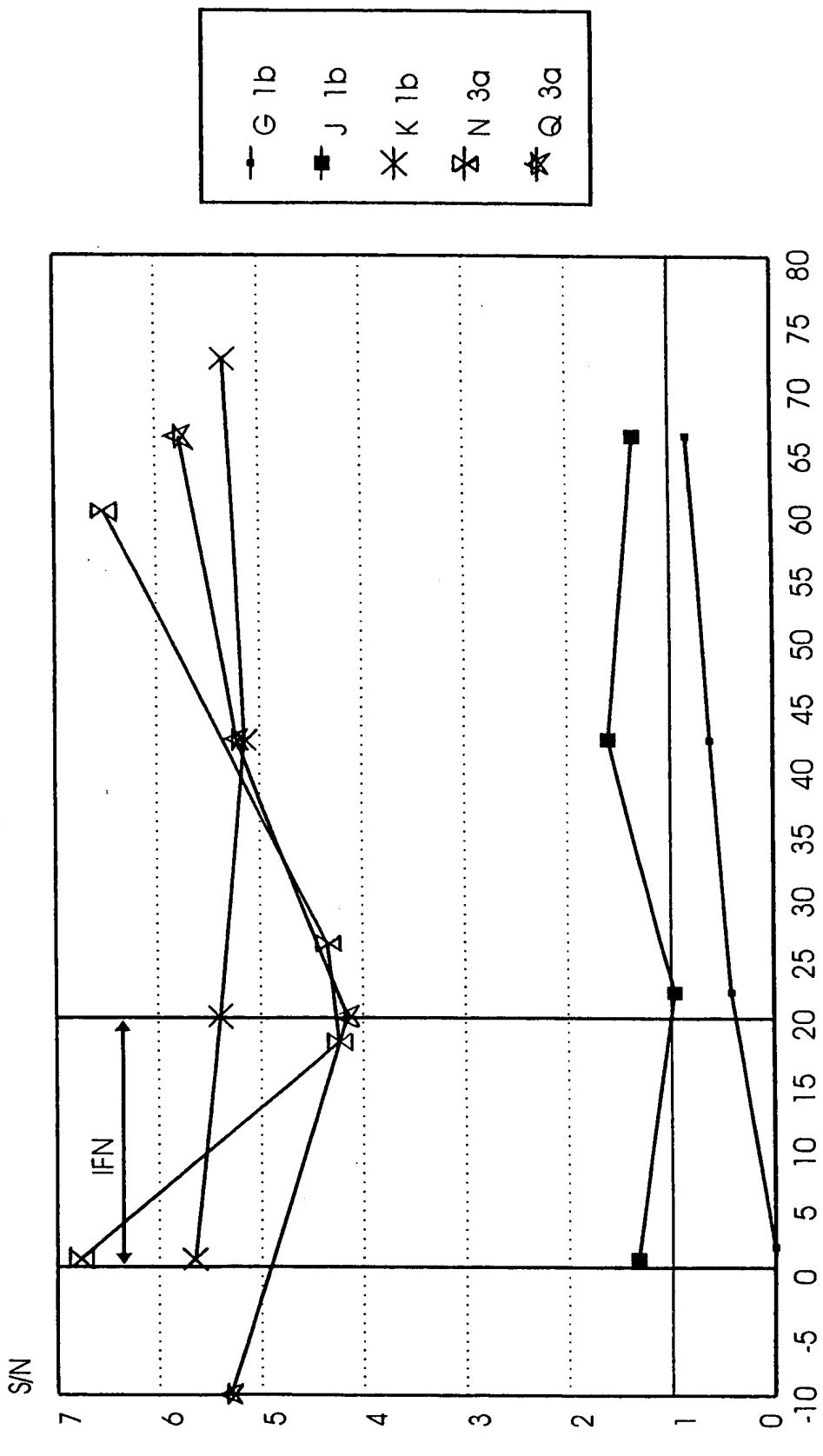


Fig. 14

Anti-E1 (epitope 1) levels in NON-RESPONDERS to IFN treatment

SERIES 1



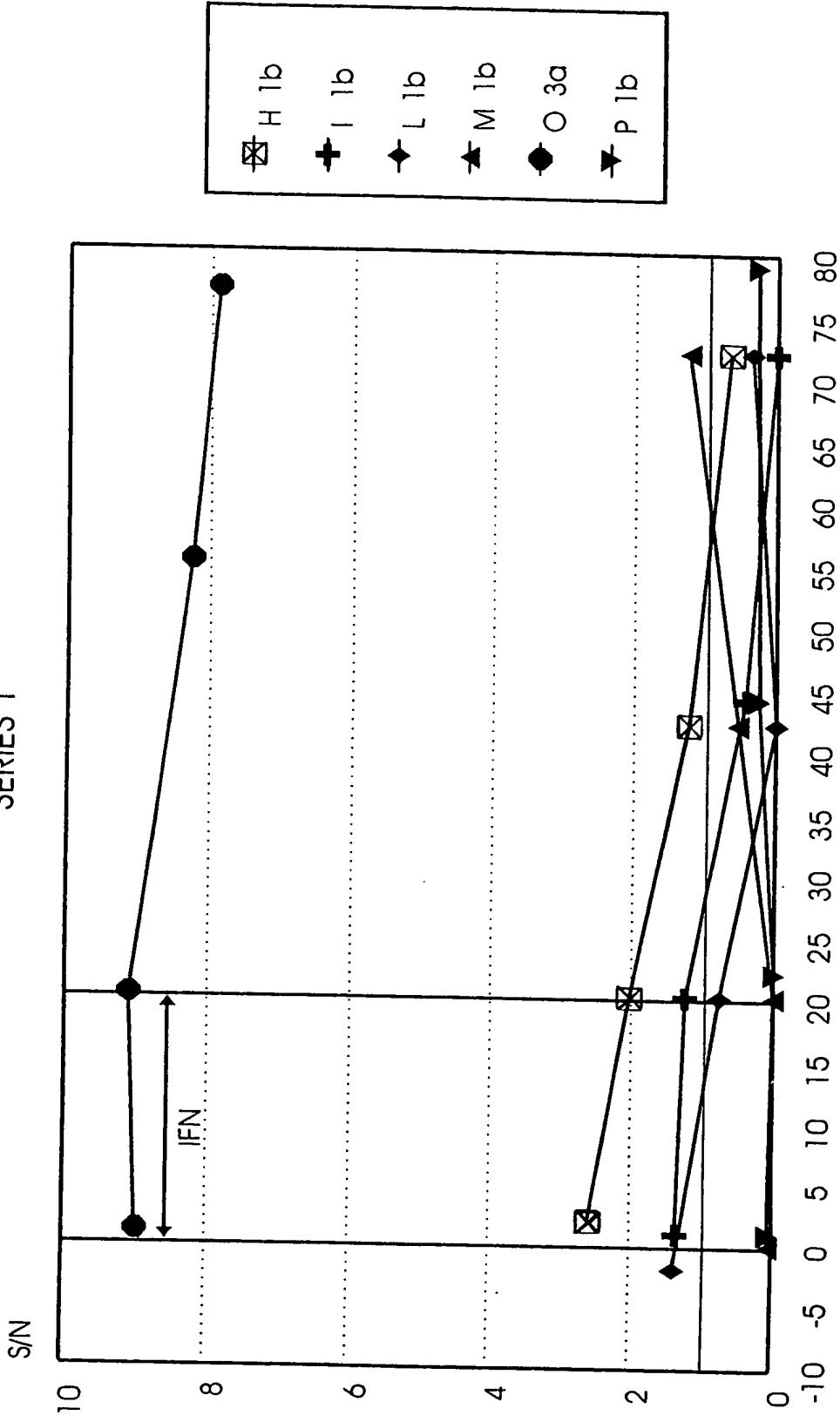
weeks after start of treatment

Fig. 15



Anti-E1 (epitope 1) levels in RESPONDERS to IFN treatment

SERIES 1



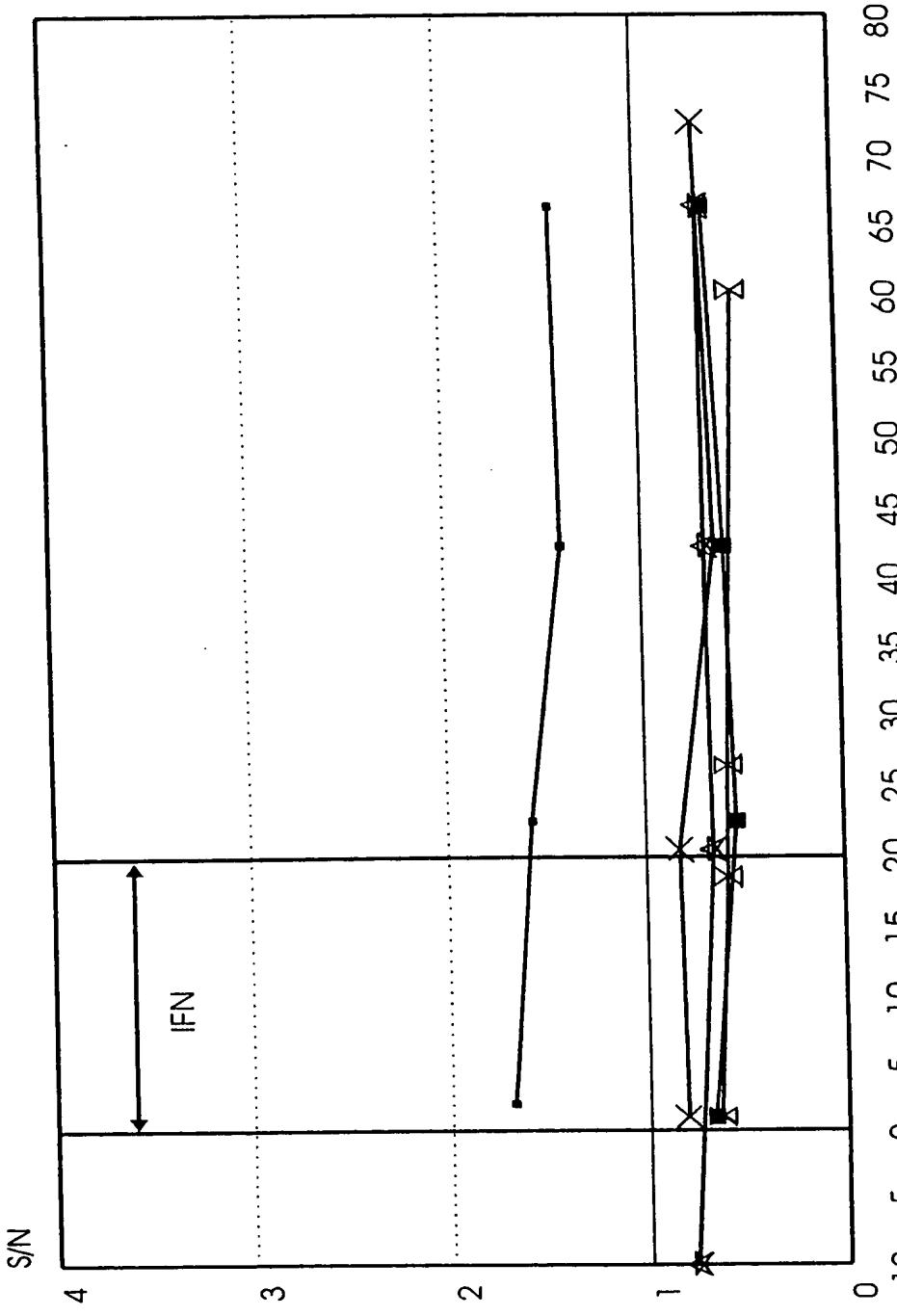
weeks after start of treatment

Fig. 16



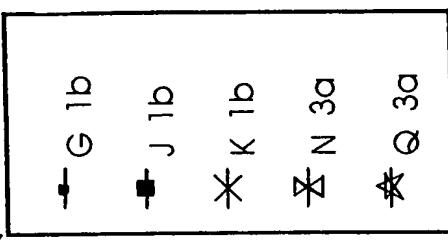
Anti-E1 (epitope 2) levels in NON-RESPONDERS to IFN treatment

SERIES 1



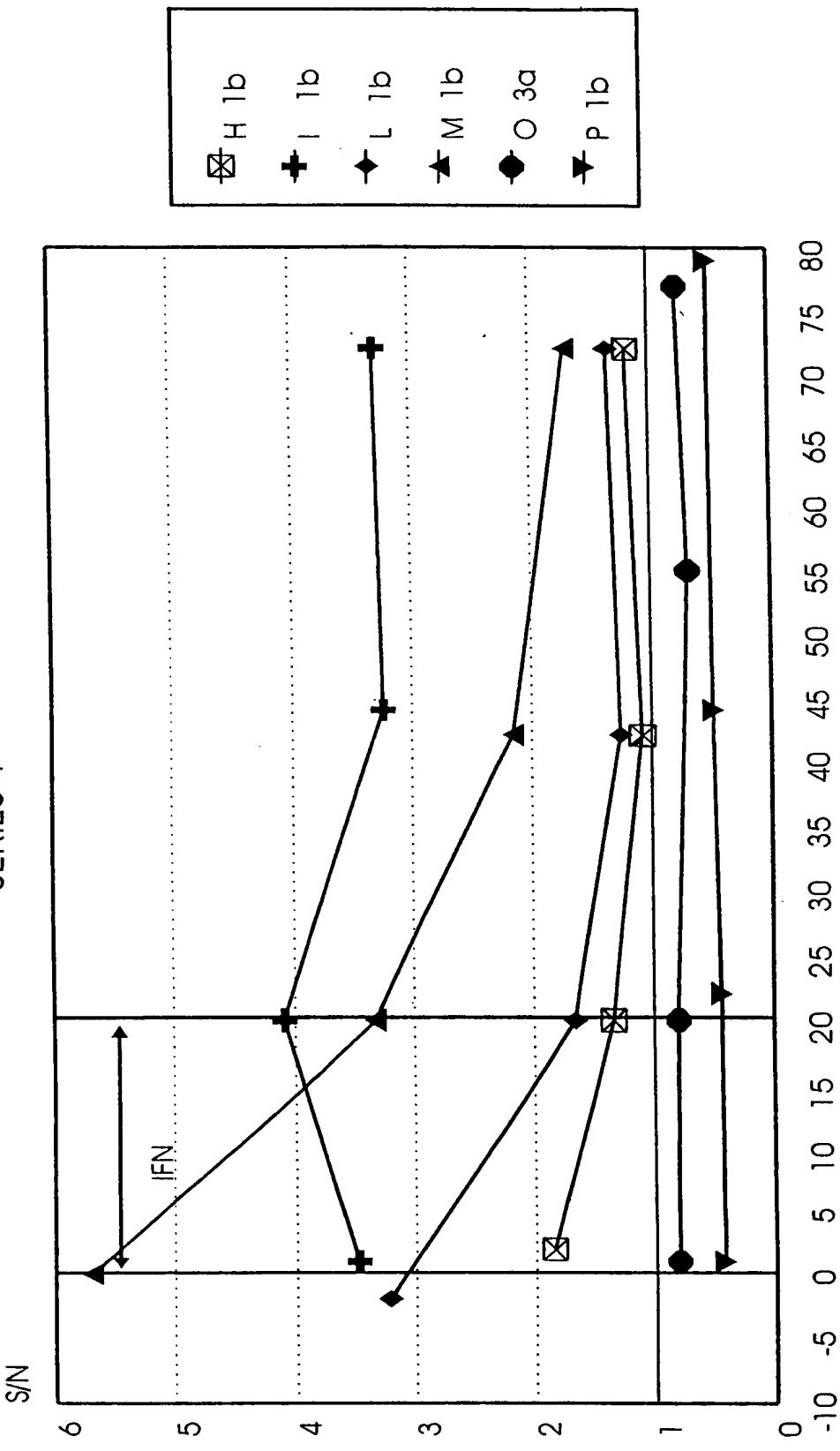
weeks after start of treatment

Fig.17



Anti-E1 (epitope 2) levels in RESPONDERS to IFN treatment

SERIES 1



weeks after start of treatment

Fig.18



Competition of reactivity of anti-E2 Mabs with peptides

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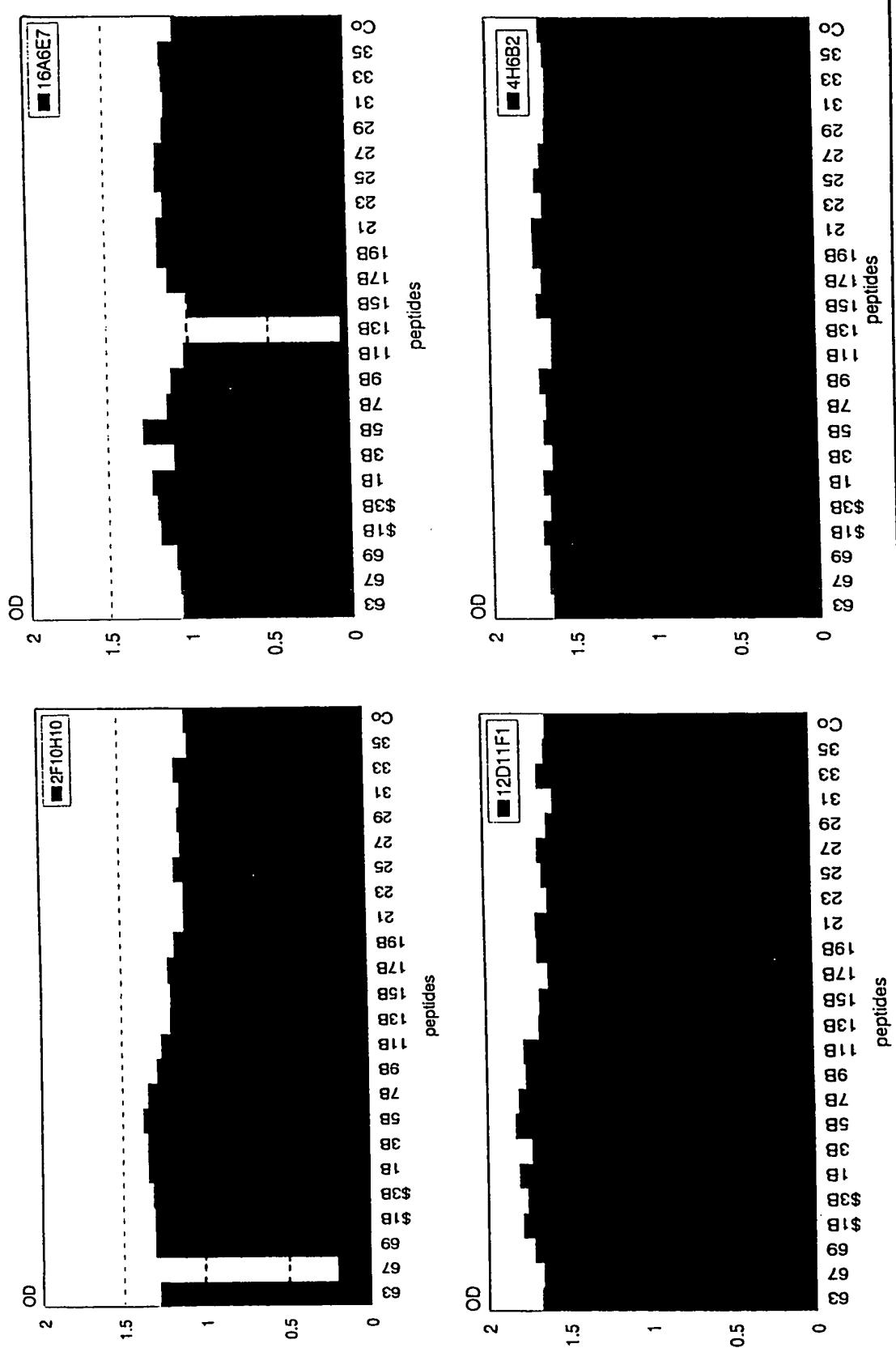


Fig. 19

Human anti-E2 reactivity competed with peptides

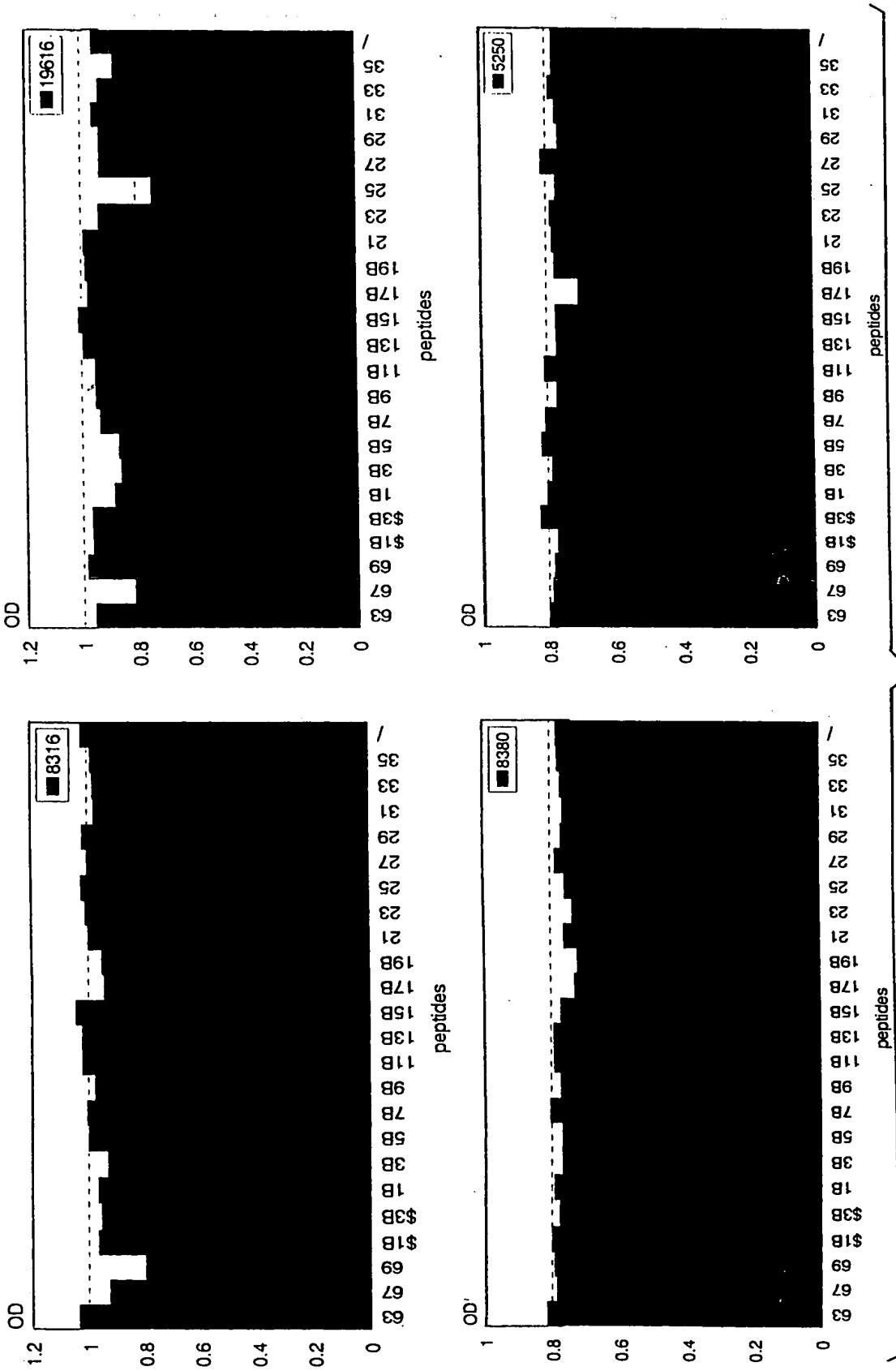


Fig. 20

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Fig. 21A

5' GGCATGCAAGCTTAATTATT3' (SEQ ID NO 1)

3'ACGTCCGTACGTTCGAATTAAATTAAATCGA5' (SEQ ID NO 94)

5'CCGGGGAGGCCTGCACGTGATCGAGGGCAGACACCATCACCAACCACATCACTAATAGT
TAATTAACTGCA 3' (SEQ ID NO 2)

3'CCTCCGGACGTGCACTAGCTCCGTCTGTGGTAGTGGTGGTAGTGATTATCAATTAAATTG
5' (SEQ ID NO 95)

SEQ ID NO 3 (HCCI9A)

ATGCCCGGTTGCTCTTCTCTATCTTCCTCTGGCTTACTGTCCTGTCTGACCATTCCA
GCTTCCGCTTATGAGGTGCGCAACGTGTCCGGATGTACCATGTCACGAACGACTGCT
CCAACCTAACGATTGTATGAGGCAGCGGACATGATCATGCAACACCCCCGGGTGCGT
GCCCTGCCTCGGGAGAACAAACTCTTCCCCTGCTGGTAGCGCTACCCCCACGCTC
GCAGCTAGGAACGCCAGCGTCCCCACCACGACAATAACGACGCCACGTCGATTTGCTCG
TTGGGGCGGCTGCTCTGTTCGCTATGTACGTGGGGATCTCTGCGGATCTGTCTTC
CTCGTCTCCCAGCTGTTACCATCTCGCCTGCCGGCATGAGACGGTGCAGGACTGCA
ATTGCTCAATCTATCCCGGCCACATAACAGGTACCGTATGGCTTGGGATATGATGAT
GAACTGGTCGCCTACACGCCCTGGTGGTATCGCAGCTGCCGGATCCCACAAGCT
GTCGTGGACATGGTGGCGGGGCCATTGGGGAGTCCTGGCGGGCCTGCCTACTATT
CCATGGTGGGAACTGGCTAAGGTTTGATTGTGATGCTACTCTTGCTCTAATAG

SEQ ID NO 5 (HCCI10A)

ATGTTGGGTAAGGTACATCGATACCCCTACATGCGGCTTCGCCGACCTCGTGGGTACA
TTCCGCTCGTCGGCGCCCCCTAGGGGGCGCTGCCAGGGCCCTGGCGCATGGCGTCCG
GGTTCTGGAGGACGGCGTGAACATATGCAACAGGGATTGCCCCGGTTGCTCTTCTCT
ATCTTCCTCTGGCTTGCTGTCTGACCGTTCCAGCTCCGCTTATGAAGTGC
CAACGTGTCCGGATGTACCATGTCACGAACGACTGCTCAAACGATTGTAT
GAGGCAGCGGACATGATCATGCACACCCCCGGTGCCTGCCCTGCCTCGGGAGAAC
AACTCTTCCCCTGCTGGTAGCGCTACCCCCACGCTCGCAGCTAGGAACGCCAGCG
TCCCCACGACAATACGACGCCACGTCGATTTGCTCGTTGGGGCGGCTGCTTCTG



Fig. 21B

TTCCGCTATGTACGTGGGGACCTCTCGGGATCTGTCTTCCTCGTCTCCCAGCTGTTCA
CCATCTCGCCTCGCCGGCATGAGACGGTGCAGGACTGCAATTGCTCAATCTATCCCAG
CCACATAACGGGTACCGTATGGCTGGATATGATGAACTGGTCGCCTACAACG
GCCCTGGTGGTATCGCAGCTGCTCCGGATCCCACAAGCTGTCGTGGACATGGTGGCGG
GGGCCATTGGGAGTCCTGGCGGGTCTGCCACTATTCCATGGTGGGAAGTGGGC
TAAGGTTTGATTGTGATGCTACTCTTGCTCCCTAATAG

SEQ ID NO 7 (HCCI11A)

ATGTTGGTAAGGTATCGATAACCTTACGTGCGGCTCGCCGACCTCATGGGTACA
TTCCGCTCGTCGGCGCCCCCTAGGGGGTGCAGCCAGAGCCCTGGCGCATGGCGTCCG
GGTCTGGAAGACGGCGTGAACATATGCAACAGGGATTGCTGGTTGCTTTCTTA
TCTTCCTCTTGGCTTACTGTCCTGTCGACCATTCCAGCTCCGCTTATGAGGTGCGC
AACGTGTCCGGATGTACCATGTCACGAACGACTGCTCAACTCAAGCATTGTATG
AGGCAGCGGACATGATCATGCACACCCCCGGTGCCTGCAGCTAGGAACGCCAGCGT
CCCCACTACGACAATACGACGCCACGTCGATTGCTCGTGGGGCCTGCTTTCTGTT
CCGCTATGTACGTGGGGATCTCTGCGATCTGTCTCCCTCGTCTCCAGCTGTTACC
ATCTCGCCTCGCCGGCATGAGACGGTGCAGGACTGCAATTGCTCAATCTATCCCAGG
ACATAACAGGTACCGTATGGCTGGATATGATGAACTGGTAATAG

SEQ ID NO 9 (HCCI12A)

ATGCCCGGTTGCTTTCTATCTTCCCTTGGCCCTGCTGTCCTGTCGACCATACCA
GCTTCCGCTTATGAAGTGCACACGTGTCCGGGTGTACCATGTCACGAACGACTGCT
CCAACACTCAAGCATAGTGTATGAGGCAGCGGACATGATCATGCACACCCCCGGTGC
GCCCTGCCTCGGGAGGGCAACTCCTCCCGTTGCTGGGTGGCGCTACTCCACGCTC
GCGGCCAGGAACGCCAGCGTCCCCACAACGACAATACGACGCCACGTCGATTGCTC
GTTGGGGCTGCTGCTTCTGTTCCGCTATGTACGTGGGGATCTGCGGATCTGTTT
CCTTGTTCAGCTGTTCACCTCACCTCGCCGGCATCAAACAGTACAGGACTGCA
ACTGCTCAATCTATCCCAGGATGTACAGGTACCGCATGGCTGGATATGATGAT
GAACTGGTCTTAATAG

SEQ ID NO 11 (HCCI13A)

ATGTCGGTTGCTTTCTATCTTCCCTTGGCCCTGCTGTCCTGTCGACCATACCA
GCTTCCGCTTATGAAGTGCACACGTGTCCGGGTGTACCATGTCACGAACGACTGCT
CCAACACTCAAGCATAGTGTATGAGGCAGCGGACATGATCATGCACACCCCCGGTGC



Fig. 21C

GCCCTGCGTCGGGAGGGCAACTCCTCCCGTTGCTGGGTGGCGCTCACTCCCACGCTC
GCGGCCAGGAACGCCAGCGTCCCCACAACGACAATACGACGCCACGTCGATTTGCTC
GTTGGGGCTGCTGCTTCTGTTCCGCTATGTACGTGGGGATCTCTGCGGATCTGTTT
CCTTGTTCAGCTGTTCACCTCTCACCTCGCCGGCATCAAACAGTACAGGACTGCA
ACTGCTCAATCTATCCGGCCATGTATCAGGTACCGCATGGCTGGATATGATGAT
GAACGGTAATAG

SEQ ID NO 13 (HCCI17A)

ATGCTGGTAAGGCCATCGATAACCCTTACGTGCGGCTTCGCCGACCTCGTGGGTACA
TTCCGCTCGTCGGGCCCTAGGGGGCGCTGCCAGGGCCCTGGCGCATGGCGTCCG
GGTTCTGAAAGACGGCGTGAACATATGCAACAGGAATTGCCTGGTTGCTCTTCTTA
TCTTCCTCTGGCTTACTGTCCGTCTAACCAATTCCAGCTTCCGTTACGAGGTGCGC
AACGTGTCCGGATGTACCATGTCACGAACGACTGCTCCAACCTAACGCATTGTGTATG
AGGCAGCGGACATGATCATGCACACCCCCGGTGCGTGCCTGCCTCGGGAGAAC
ACTCTCCCGCTGCTGGTAGCGCTACCCCCACGCTCGCGCTAGGAACGCCAGCAT
CCCCACTACAACAATACGACGCCACGTCGATTGCTCGTTGGGGCGGCTGCTTCTGTT
CCGCTATGTACGTGGGGATCTCTGCGGATCTGCTTCCCTCGTCTCCAGCTGTTCA
ATCTGCCTCGCCGGCATGAGACGGTGAGGACTGCAATTGCTCAATCTATCCGGCC
ACATAACGGGTACCGTATGGCTGGATATGATGATGAACTGGTACTAATAG

SEQ ID NO 15 (HCPr51)

ATGCCCGGTTGCTTTCTATCTT

SEQ ID NO 16 (HCPr52)

ATGTTGGTAAGGTACCGATAACCCT

SEQ ID NO 17 (HCPr53)

CTATTAGGACCAAGTCATCATCATATCCCA

SEQ ID NO 18 (HCPr54)

CTATTACCAAGTCATCATCATATCCCA

SEQ ID NO 19 (HCPr107)

ATACGACGCCACGTCGATTCCCAGCTGTTACCCATC



Fig. 21D

SEQ ID NO 20 (HCP108)

GATGGTGAACAGCTGGGAATCGACGTGGCGTCGTAT

SEQ ID NO 21 (HCCI37)

ATGTTGGTAAGGTACATCGATAACCCTACATGCGGCTTCGCCGACCTCGTGGGTACA
TTCCGCTCGTCGGCGCCCCCTAGGGGGCGCTGCCAGGGCCCTGGCGCATGGCGTCCG
GGTTCTGGAGGACGGCGTGAACATATGCAACAGGAATTGCCCGGTTGCTCTTCTCT
ATCTCCTCTTGGCTTGCTGTCTGACCGTTCCAGCTCCGCTTATGAAGTGCG
CAACGTGTCCGGGATGTACCATGTCACGAACGACTGCTCCAACCTCAAGCATTGTGTAT
GAGGCAGCGGACATGATCATGCACACCCCCGGTGCCTGCCCTGCAGCTCGGGAGAAC
AACTCTTCCCCTGCTGGTAGCGCTCACCCCCACGCTCGCAGCTAGGAACGCCAGCG
TCCCCACCACGACAATACGACGCCACGTCGATTCCAGCTGTTACCATCTCGCCTCG
CCGGCATGAGACGGTGCAGGACTGCAATTGCTCAATCTATCCGGCACATAACGGGT
CACCGTATGGCTTGGATATGATGATGAACGGTGCCTACAACGGCCCTGGTGGTAT
CGCAGCTGCTCCGGATCCCACAAGCTGTCGGACATGGTGGCGGGGCCATTGGGG
AGTCCTGGCGGGTCTGCCTACTATTCCATGGTGGGAACGGGCTAAGGTTTGATTG
TGATGCTACTTTGCTCCCTAATAG

SEQ ID NO 23 (HCCI38)

ATGTTGGTAAGGTACATCGATAACCCTACATGCGGCTTCGCCGACCTCGTGGGTACA
TTCCGCTCGTCGGCGCCCCCTAGGGGGCGCTGCCAGGGCCCTGGCGCATGGCGTCCG
GGTTCTGGAGGACGGCGTGAACATATGCAACAGGAATTGCCCGGTTGCTCTTCTCT
ATCTCCTCTTGGCTTGCTGTCTGACCGTTCCAGCTCCGCTTATGAAGTGCG
CAACGTGTCCGGGATGTACCATGTCACGAACGACTGCTCCAACCTCAAGCATTGTGTAT
GAGGCAGCGGACATGATCATGCACACCCCCGGTGCCTGCCCTGCAGCTCGGGAGAAC
AACTCTTCCCCTGCTGGTAGCGCTCACCCCCACGCTCGCAGCTAGGAACGCCAGCG
TCCCCACCACGACAATACGACGCCACGTCGATTCCAGCTGTTACCATCTCGCCTCG
CCGGCATGAGACGGTGCAGGACTGCAATTGCTCAATCTATCCGGCACATAACGGGT
CACCGTATGGCTTGGATATGATGATGAACGGTAA
TAG

SEQ ID NO 25 (HCCI39)

ATGTTGGTAAGGTACATCGATAACCCTACATGCGGCTTCGCCGACCTCGTGGGTACA
TTCCGCTCGTCGGCGCCCCCTAGGGGGCGCTGCCAGGGCCCTGGCGCATGGCGTCCG
GGTTCTGGAGGACGGCGTGAACATATGCAACAGGAATTGCCCGGTTGCTCTTCTCT



Fig. 21E

ATCTTCCTCTGGCTTGCTGTCCTGTCTGACCGTTCCAGCTTCCGCTTATGAAGTGCG
CAACGTGTCCGGGATGTACCATGTCACGAACGACTGCTCCAACCTAAGCATTGTAT
GAGGCAGCGGACATGATCATGCACACCCCCGGGTGCGTGCCTGCGTTGGGAGAAC
AACTCTTCCCCTGCTGGTAGCGCTACCCCCACGCTCGCAGCTAGGAACGCCAGCG
TCCCCACCACGACAATACGACGCCACGTCGATTCCCAGCTGTTCACCATCTCGCCTCG
CCGGCATGAGACGGTGCAGGACTGCAATTGCTCAATCTATCCGGCCACATAACGGGT
CACCGTATGGCTGGATATGATGATGAACGGTCGCCTACAACGGCCCTGGTGGTAT
CGCAGCTGCTCCGGATCCTCTAATAG

SEQ ID NO 27 (HCCI40)

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TTCCGCTCGTCGGCGCCCCCTAGGGGGCGCTGCCAGGGCCCTGGCGCATGGCGTCCG
GGTTCTGGAGGGACGGCGTGAACATATGCAACAGGGATTGCCCCGGTTGCTCTTCTCT
ATCTTCCTCTGGCTTGCTGTCCTGTCTGACCGTTCCAGCTTCCGCTTATGAAGTGCG
CAACGTGTCCGGGATGTACCATGTCACGAACGACTGCTCCAACCTAAGCATTGTAT
GAGGCAGCGGACATGATCATGCACACCCCCGGGTGCGTGCCTGCGTTGGGAGAAC
AACTCTTCCCCTGCTGGTAGCGCTACCCCCACGCTCGCAGCTAGGAACGCCAGCG
TCCCCACCACGACAATACGACGCCACGTCGATTCCCAGCTGTTCACCATCTCGCCTCG
CCGGCATGAGACGGTGCAGGACTGCAATTGCTCAATCTATCCGGCCACATAACGGGT
CACCGTATGGCTGGATATGATGATGAACGGTCGCCTACAACGGCCCTGGTGGTAT
CGCAGCTGCTCCGGATCGTACGAGGGCAGACACCACCACTACACTAATAG

SEQ ID NO 29 (HCCI62)

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CGCTCGTCGGCGCTCCGTAGGAGGGCGTCGCAAGAGGCCCTGCGCATGGCGTGGGGC
CCTTGAAGACGGGATAAATTGCAACAGGGATTGCCCCGGTTGCTCCTTTCTATT
TCCTTCTCGCTCTGTTCTTTGCTTAATTGCAACAGCAGCTAGTCTAGAGTGGCGGAAT
ACGTCTGGCCTCTATGTCCTTACCAACGACTGTTCCAATAGCAGTATTGTGTACGAGGC
CGATGACGTTATTCTGCACACACCCGGCTGCATACCTTGTCCAGGACGGCAATACA
TCCACGTGCTGGACCCCAGTGACACCTACAGTGGCAGTCAAGTACGTCGGAGCAACCA
CCGCTTCGATACGCAGTCATGTGGACCTATTAGTGGCGCGGCCACGATGTGCTCTGC
GCTCTACGTGGGTGACATGTGTGGGCTGTCTCCTCGTGGACAAGCCTCACGTTCA
GACCTCGTCGCCATCAAACGGTCCAGACCTGTAACTGCTCGTGTACCCAGGCCATCT
TTCAGGACATCGAATGGCTGGATATGATGATGAACGGTAATAG



Fig. 21F

SEQ ID NO 31 (HCCI63)

ATGGGTAAGGTATCGATAACCTAACGTGCGGATTGCCGATCTCATGGGTATATCC
CGCTCGTAGGCGGCCATTGGGGCGTCGAAGGGCTCGCACACGGTGTGAGGGT
CCTTGAGGACGGGTAAACTATGCAACAGGAATTACCCGGTTGCTCTTCTATCT
TTATTCTTGCTCTCTCGTGTCTGACCGTTCCGGCCTCTGCAGTCCCTACCGAAATG
CCTCTGGATTATCATGTTACCAATGATTGCCAAACTCTTCCATAGTCTATGAGGCA
GATAACCTGATCCTACACGCACCTGGTGCCTGTGCATGACAGGTAATGTGA
GTAGATGCTGGTCCAAATTACCCCTACACTGTCAGCCCCGAGCCTCGGAGCAGTCAC
GGCTCCTCTCGGAGAGCCGTTGACTACCTAGCGGGAGGGCTGCCCTTGCTCCGCG
TTATACGTAGGAGACCGTGTGGGCACTATTCTGGTAGGCCAAATGTTCACCTATA
GGCCTGCCAGCACGCTACGGTGCAGAACTGCAACTGTTCCATTACAGTGGCCATGT
TACCGGCCACCGGATGGCATGGATATGATGATGAACGGTAATAG

SEQ ID NO 33 (HCPr109)

TGGGATATGATGATGAACGGTC

SEQ ID NO 34 (HCPr72)

CTATTATGGTGGTAAKGCCARCARCAGAGCAGGAG

SEQ ID NO 35 (HCCL22A)

TGGGATATGATGAACGGTCGCCAACACGGCCCTGGTGGTATCGCAGCTGCTCC
GGATCCCACAAGCTGCGTGGACATGGTGGCGGGGCCATTGGGAGTCCTGGCGG
GCCTCGCCTACTATTCCATGGTGGGAACTGGCTAAGGTTGGTGTATGCTACTC
TTGCCGGCGTCGACGGGCATACCCCGTGTCAAGGAGGGCAGCAGCCTCCGATACCA
GGGGCCTTGTGTCCCTCTTAGCCCCGGTGGCTCAGAAAATCCAGCTCGTAAACAC
CAACGGCAGTTGGCACATCAACAGGACTGCCCTGAACGCAACGACTCCCTCAAAC
AGGGTTCTTGCCGCACTATTCTACAAACACAAATTCAACTCGTCTGGATGCCAGAG
CGCTTGGCCAGCTGCGCTCATCGACAAGTCGCTCAGGGTGGGTCCCTCACTT
ACACTGAGCCTAACAGCTGGACCAGAGGCCACTGCTGGCACTACGCGCCTCGACC
GTGTGGTATTGTACCCCGTCTCAGGTGTGGTCCAGTGTATTGCTTCACCCCGAGCC
CTGTTGTGGTGGGACGACCGATGGTTGGTGTCCCCACGTATAACTGGGGCGAA
CGACTCGGATGTGCTGATTCTAACAAACACGCGGCCGCGAGGCAACTGGTTCGGC
TGTACATGGATGAATGGCACTGGGTTACCAAGACGTGTGGGGCCCCCGTGCAACA
TCGGGGGGCCGGCAACAAACACCTTGACCTGCCCACTGACTGTTCGGAAGCACCC
CGAGGCCACCTACGCCAGATGCGGTTCTGGCCCTGGCTGACACCTAGGTGTATGGTT



Fig. 21G

CATTACCCATATAGGCTCTGGCACTACCCCTGCACTGTCAACTTACCATCTTCAGGT
TAGGATGTACGTGGGGCGTGGAGCACAGGTTGAAGCCGCATGCAATTGGACTCG
AGGAGAGCGTTGTGACTGGAGGACAGGGATAGATCAGAGCTTAGCCCCTGCTGCTG
TCTACAACAGAGTGGCAGATACTGCCCTGTTCTACCACCCCTGCCGGCCATCCA
CCGGCCTGATCCACCTCCATCAGAACATCGTGGACGTGCAATACCTGTACGGTAGG
GTCGGCGGTTGTCTCCCTGTCAAAATGGAGTATGTCCTGTTGCTCTTCCCTCCT
GGCAGACGCGCGCATCTGCCCTGCTTATGGATGATGCTGCTGATAGCTAAGCTGAG
GCCGCCCTAGAGAACCTGGTGGTCCTCAATGCCCGGGCGTGGCCGGGCATGGC
ACTCTTCCTTCTGTGTTCTGTGCTGCCCTGGTACATCAAGGGCAGGCTGGTCCC
TGGTGCAGGCATACGCCCTCATGGCGTGTGGCCGCTGCTCCTGCTTGCTGCCCTAC
CACCACGAGCTTATGCCCTAGTAA

SEQ ID NO 37 (HCCI41)

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CCTCGCCTACTATTCCATGGTGGGAACTGGGCTAAGGTTGGTTGTGATGCTACTCT
TTGCCGGCGTCGACGGGCATACCCGCGTGTCAAGGAGGGCAGCAGCCTCCGATAACCA
GGGGCCTTGTGTCCTCTTAGCCCCGGTCGGCTCAGAAAATCCAGCTCGTAAACAC
CAACGGCAGTTGGCACATCAACAGGACTGCCCTGAAGTCAACGACTCCCTCAAAC
AGGGTTCTTGCCGCACTATTCTACAAACACAAATTCAACTCGTCTGGATGCCAGAG
CGCTTGGCCAGCTGTCGCTCCATCGACAAGTTGCTCAGGGTGGGTCCCCCTCACTT
ACACTGAGCCTAACAGCTGGACCAAGAGGCCCTACTGCTGGCACTACGCCCTCGACC
GTGTGGTATTGTACCCCGTCTCAGGTGTGCGGTCCAGTGTATTGCTTCACCCCGAGCC
CTGTTGGTGGGGACGACCGATGGTTGGTGTCCCCACGTATAACTGGGGGGCGAA
CGACTCGGATGTGATTCTCAACAAACACGCCGCCGCGAGGCAACTGGTTCGGC
TGTACATGGATGAATGGCACTGGTTCAACCAAGACGTGTGGGGCCCCCGTCAACAA
TCGGGGGGCCGGCAACAAACACCTTGACCTGCCCCACTGACTGTTTCGGAAGCACCC
CGAGGCCACCTACGCCAGATGCCGTTCTGGGCCCTGGCTGACACCTAGGTGTGGTT
CATTACCCATATAGGCTCTGGCACTACCCCTGCACTGTCAACTTACCATCTTCAGGT
TAGGATGTACGTGGGGCGTGGAGCACAGGTTGAAGCCGCATGCAATTGGACTCG
AGGAGAGCGTTGTGACTGGAGGACAGGGATAGATCAGAGCTTAGCCCCTGCTGCTG
TCTACAACAGAGTGGCAGAGTGGCAGAGCTTAATTAAATTAG

SEQ ID NO 39 (HCCI42)

GATCCCACAAGCTGTCGTGGACATGGTGGCGGGGGCCATTGGGAGTCCTGGCGGG
CCTCGCCTACTATTCCATGGTGGGAACTGGGCTAAGGTTGGTTGTGATGCTACTCT



Fig. 21H

TTGCCGGCGTCGACGGGCATACCCGCGTGTCAAGGAGGGGCAGCAGCCTCCGATACCA
GGGGCCTTGTGTCCTCTTAGCCCCGGGTCGGCTCAGAAAATCCAGCTCGTAAACAC
CAACGGCAGTTGGCACATCAACAGGACTGCCCTGAAC TGCAACGACTCCCTCAAAC
AGGGTTCTTGCCGCACATTCTACAAACACAAATTCAACTCGTCTGGATGCCAGAG
CGCTTGGCCAGCTGTCGCTCCATCGACAAGTTGCTCAGGGTGGGTCCCCTCACTT
ACACTGAGCCTAACAGCTCGGACCAGAGGCCACTGCTGGCACTACGCGCCTCGACC
GTGTGGTATTGTACCCCGTCTCAGGTGTGCGGTCCAGTGTTGCTTCAACCCGAGCC
CTGTTGTGGTGGGACGACCGATCGGTTGGTGTCCCCACGTATAACTGGGGGCGAA
CGACTCGGATGTGCTGATTCTAACAAACACGCGGCCGCGAGGCAACTGGTTCGGC
TGTACATGGATGAATGGCACTGGTTACCAAGACGTGTGGGGGCCCCGTGCAACA
TCGGGGGGCCGGCAACAAACACCTTGACCTGCCCCACTGACTGTTTGGGAAGCACCC
CGAGGCCACCTACGCCAGATCGGTTCTGGCCACTACCCCTGCACTGTCAACTTACCATCTTCAAGGT
CATTACCCATATAGGCTCTGGCACTACCCCTGCACTGTCAACTTACCATCTTCAAGGT
TAGGATGTACGTGGGGGGCGTGGAGCACAGGTTGAAAGCCGATGCAATTGGACTCG
AGGAGAGCGTTGTGACTGGAGGACAGGGATAGATCAGAGCTTAGCCGCTGCTGCTG
TCTACAACAGGTGATCGAGGGCAGACACCACCACTACCAACTAATAG

SEQ ID NO 41 (HCCI43)

ATGGTGGGAACTGGCTAAGGTTGGTTGATGCTACTCTTGCCGGCGTCGACG
GGCATACCCCGTGTCAAGGAGGGCAGCAGCCTCCGATACCAGGGCCTTGTGCTCCCT
CTTAGCCCCGGTGGCTCAGAAAATCCAGCTCGTAAACACCAACGGCAGTTGGCAC
ATCAACAGGACTGCCCTGAAC TGCAACGACTCCCTCAAACAGGGTTCTTGCCGCAC
TATTCTACAAACACAAATTCAACTCGTCTGGATGCCAGAGCGCTTGGCCAGCTGTGCG
CTCCATCGACAAGTTGCTCAGGGTGGGTCCCCACTTACACTGAGCCTAACAGC
TCGGACCAGAGGCCACTGCTGGCACTACGCCCTCGACCGTGTGGTATTGTACCCG
CGTCTCAGGTGTGCGGTCCAGTGTTGCTTCAACCCGAGCCCTGTTGTGGTGGGAC
GACCGATGGTTGGTGTCCCCACGTATAACTGGGGGGCGAACGACTCGGATGTGCTG
ATTCTCAACAAACACGCCCGCCGAGGCAACTGGTTGGCTGTACATGGATGAATG
GCACTGGTTACCAAGACGTGTGGGGCCCCCGTGCAACATGGGGGGCCGGCA
ACAACACCTTGACCTGCCCCACTGACTGTTTGGCAAGCACCCGAGGCCACCTACGC
CAGATGCGGTTCTGGCCCTGGCTGACACCTAGGTGTATGGTTATTACCCATATAGG
CTCTGGCACTACCCCTGCACTGTCAACTTACCATCTCAAGGTTAGGATGTACGTGGG
GGCGTGGAGCACAGGTTGAAAGCCGATGCAATTGGACTCGAGGAGAGCGTTGTGA
CTTGGAGGACAGGGATAGATCAGAGCTTAGCCGCTGCTGCTACAACAGAGTGG
CAGAGCTTAATTAATTAG



Fig. 21I

SEQ ID NO 43 (HCCI44)

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 ATCAACAGGACTGCCCTGAAC TGCAACGACTCCCTCAAACAGGGTTCTTGCCGCAC
 TATTCTACAAACACAAATTCAACTCGTCTGGATGCCAGAGCGCTTGGCCAGCTGTG
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 TCGGACCAGAGGCCCTACTGCTGGCACTACGCGCCTCGACC GTGTGGTATTGTACCCG
 CGTCTCAGGTGTGCGGTCCAGTGTATTGCTTACCCCGAGCCCTGTTGTGGTGGGAC
 GACCGATCGGTTGGTGTCCCACGTATAACTGGGGGCGAACGACTCGGATGTGCTG
 ATTCTCAACAAACACGCGGCCGCCGAGGCAACTGGTCCGGCTGTACATGGATGAATG
 GCACTGGGTTACCAAGACGTGTGGGGCCCCCGTGC AACATCGGGGGGCCGGCA
 ACAACACCTTGACCTGCCCCACTGACTGTTTGGAAAGCACCCGAGGCCACCTACGC
 CAGATCGGTTCTGGCCCTGGCTGACACCTAGGTGTATGGTCATTACCCATATAGG
 CTCTGGCACTACCCCTGCACTGTCAACTTACCATCTTCAAGGTTAGGATGTACGTGG
 GGGCGTGGAGCACAGGTTGAAGCCGATGCAATTGGACTCGAGGAGAGCGTTGTGA
 CTTGGAGGACAGGGATAGATCAGAGCTTAGCCGCTGCTGTCTACAACAGGTGAT
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SEQ ID NO 45 (HCCL64)

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 CCGCGTGTCAAGGAGGGCAGCAGCCTCCGATACCAGGGCCTGTGTCCTCTTAGC
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 CAGAGGCCCTACTGCTGGCACTACGCGCCTCGACC GTGTGGTATTGTACCCGCGTCTC
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 AACAAACACGCGGCCGCCGAGGCAACTGGTCCGGCTGTACATGGATGAATGGCACT
 GGGTTACCAAGACGTGTGGGGCCCCCGTGC AACATCGGGGGGCCGGAACAAAC
 ACCTTGACCTGCCCCACTGACTGTTTGGAAAGCACCCGAGGCCACCTACGCCAGAT
 GCGGTTCTGGCCCTGGCTGACACCTAGGTGTATGGTCATTACCCATATAGGCTCTGG
 CACTACCCCTGCACTGTCAACTTACCATCTTCAAGGTTAGGATGTACGTGGGGGCG



Fig. 21J

TGGAGCACAGGTTGAAGCCGCATGCAATTGGACTCGAGGGAGAGCGTTGTGACTTGGAGGACAGGGATAGATCAGAGCTTAGCCCGCTGCTGTCTACAACAGAGTGGCAGATACTGCCCTGTTCTTACCCACCCCTGCCGGCCCTATCCACCGGCCTGATCCACCTCCATCAAACATCGTGGACGTGCAATACCTGTACGGTAGGGTCGGCGGTTGTCTCCCTTGTCAATCAAATGGGAGTATGTCCTGTTGCTCTCCTCTGGCAGACGCGCGCATCTGCGCTGCTTATGGATGATGCTGCTGATAAGCTAAGCTGAGGCCGCTTAGAGAACCTGGTGTCCTCAATGCCGGCGCTGGCCGGGCGCATGGCACTCTTCCTTGTGTTCTTCTGTGCTGCCCTGGTACATCAAGGGCAGGCTGGTCCCTGGTGC GG CATACGCCCTATGGCGTGGCCGCTGCTCCTGCTGGCCTTACCAACCACGAGCTTATGCCTAGTAA

SEQ ID NO 47 (HCCI65)

AATTGGGTAAGGTATCGATACCCCTACATGCCGTTGCCGACCTCGTGGGTACA TTCCGCTCGCGCCCCCTAGGGGGCGCTGCCAGGGCCCTGGCGCATGGCGTCCGGTTCTGGAGGACGGCGTGAACATATGCAACAGGAATTGCCCGGTTGCTCTTCTCTATCTCCTCTGGCTTGCTGTCTGACCGTTCCAGCTCCGCTTATGAAGTGC GCAACGTGTCCGGATGTACCATGTCACGAACGACTGCTCCAACACTCAAGCATTGTGTATGAGGCAGCGACATGATCATGCACACCCCCGGTGC GTGCCCTGCGTTCGGGAGAAC AACTCTCCGCTGCTGGTAGCGCTACCCCCACGCTCGCAGCTAGGAACGCCAGCGTCCCCACCACGACAATACGACGCCACGTCGATTGCTCGTTGGGGCGCTGCTTCTGTTCCGCTATGTACGTGGGGACCTCTGCGGATCTGTCTTCCCTCGTCTCCAGCTGTTCA CCATCTGCCCTGCCGGCATGAGACGGTGCAGGACTGCAATTGCTCAATCTATCCCGCCACATAACGGGTACCGTATGGCTGGATATGATGAAC TGGTCGCCTACAACGCCCTGGTGGTATCGCAGCTGCTCCGGATCCCACAAGCTGTCGTGGACATGGTGGCGGGCCATTGGGAGTCCTGGCGCTCGCTACTATTCCATGGTGGGAAC TGGC TAAGGTTTGGTTGATGCTACTCTTGCCGGCGTCGACGGGATACCCGCGTGT CAGGAGGGCAGCAGCCTCCGATACCAGGGCCTTGTGTCCTCTTACAGGGTCTTGGCCAGCTGTCGCTCCATCGACAAGTTGCAACTCGTCTGGATGCCAGAGCGCTTGGCCAGCTGTCGCTCCATCGACAAGTTGCTCGCTCCGTAACGACTCCCTCCAAACAGGGTCTTGGCCAGCTATTCTACAAACACAAA TTCAACTCGTCTGGATGCCAGAGCGCTTGGCCAGCTGTCGCTCCATCGACAAGTTGCTCGCTCCGACTACCTGAGCCTAACAGCTCGGACCGAGAGGCCCTA CTGCTGGCACTACGCGCTCGACCGTGTGGTATTGTACCCGCGTCTCAGGTGTGCGGTCCAGTGTATTGCTTACCCGCTCGCTACTGGTGGGACGACCGATCGGTTGGTGT CCCACGTATAACTGGGGCGAACGACTCGGATGTGCTGATTCTCAACAAACACGCCGGCCGCGAGGCAACTGGTTCGGCTGTACATGGATGAATGGCACTGGTTCACCAAGA CGTGTGGGGCCCCCGTCAACATGGGGGGCCGGCAACAAACACCTTGACCTGCC



Fig. 21K

CCACTGACTTTCGGAAGCACCCGAGGCCACCTACGCCAGATGCCGGTCTGGGCC
CTGGCTGACACCTAGGTGTGGTCATTACCCATAGGCTCTGGCACTACCCCTGCA
CTGTCAACTTCACCACCTCAAGGTTAGGATGTACGTGGGGCGTGGAGCACAGGTT
CGAACGCCATGCAATTGGACTCGAGGAGAGCGTTGTGACTTGAGGACAGGGATAG
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TTCACCACCCCTGCCGGCCCTATCCACCGGCCTGATCCACCTCCATCAGAACATCGTGG
ACGTGCAATACCTGTACGGTGTAGGGTCGGCGTTGTCTCCCTGTCAAAATGGGA
GTATGCTGTTGCTCTTCCTCTCCGGCAGACGCCGCATCTGCCCTGCTTATGGA
TGATGCTGCTGATAAGCTCAAGCTGAGGCCCTAGAGAACCTGGTGGCCTCAATGC
GGCGGCCGTGGCCGGGCGCATGGCACTTTCCCTGTGTTCTGTGCTGCC
GGTACATCAAGGGCAGGCTGGTCCCTGGTGCAGCAGCCTATGGCGTGGCC
GCTGCCCTGCTCTGCTGCCCTACCAACCACGAGCTTAGCCTAGTAAGCTT

SEQ ID NO 49 (HCCI66)

ATGAGCACGAATCCTAACCTCAAAGAAAAACCAAACGTAACACCAACCGCCGCCA
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GCAGGGGCCAGGGTTGGGTGTGCGCGACTAGGAAGACTTCCGAGCGGTGCAAC
CTCGTGGAGGCAGAACCTATCCCCAAGGCTGCCGACCCGAGGGTAGGGCCTGGG
CTCAGCCCAGGGTACCCCTGGCCCTCTATGGCAATGAGGGCATGGGTGGCAGGATG
GCTCCTGTACCCCGGGCTCTGCCCTAGTTGGGCCCTACAGACCCCGGTAGG
TCGCGTAATTGGGTAAAGGTATCGATACCCCTACATGCCGCTCGCCGACCTCGTGG
GGTACATTCCGCTCGCGCCCCCTAGGGCGCTGCCAGGGCCCTGGCGATGG
CGTCCGGTTCTGGAGGACGGCGTGAACATGCAACAGGAATTGCCCGTTGCTCT
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GTGCGCAACGTGTCCGGATGTACCATGTCACGAACGACTGCTCCAACCAAGCATTG
TGTATGAGGCAGCGACATGATCATGCACACCCCCGGGTGCGTGCCTGCGTTGGGA
GAACAACTCTCCGCTGGTAGCGCTACCCCCACGCTCGCAGCTAGGAACGCC
AGCGTCCCCACACGACAATACGACGCCACGTCGATTTGCTCGTTGGGGCGCTGCTT
TCTGTTCCGCTATGTACGTGGGGACCTCTCGGGATCTGTCTTCCCTCGTCTCCAGCTG
TTCACCATCTGCCCTGCCGGCATGAGACGGTGCAGGACTGCAATTGCTCAATCTATC
CCGCCACATAACGGGTACCGTATGGCTGGGATATGATGACTGGTGCCTAC
AACGGCCCTGGTGGTATCGCAGCTGCCGGATCCCACAAGCTGCGTGGACATGGTG
GCGGGGGCCATTGGGAGTCCTGGCGGGCCTGCCACTATTCCATGGTGGGAAC
GGGCTAAGGTTTGGTTGTGATGCTACTCTTGCCGGCGTGCAGGGCATACCGCGT
GTCAGGAGGGCAGCAGCCTCGATACCAGGGCCTGTGCTCCCTTTAGCCCCGGG



Fig. 21L

TCGGCTCAGAAAATCCAGCTCGTAAACACCAACGGCAGTGGCACATCAACAGGACT
GCCCTGAAC TGCAACGACTCCCTCCAAACAGGGTTCTTGCCGACTATTCTACAAAC
ACAAATTCAACTCGTCTGGATGCCAGAGCGCTGGCCAGCTGTCGCTCCATCGACAA
GTTCGCTCAGGGTGGGTCCCCTCACTTACACTGAGCCTAACAGCTCGGACCAGAGG
CCCTACTGCTGGCACTACGCGCCTCGACC GTGTGGTATTGTACCCGCGTCTCAGGTGT
GCGGTCCAGTGTATTGCTTCACCCCGAGCCCTGTTGTGGTGGGACGACCGATCGGTT
TGGTGTCCCCACGTATAACTGGGGGGCGAACGACTCGGATGTGCTGATTCTAACAAAC
ACGCGGCCGCCCGAGGCAACTGGTTCGGCTGTACATGGATGAATGGCACTGGTTCA
CCAAGACGTGTGGGGCCCCCGTGCAACATCGGGGGGGCGGCAACAAACACCTTGA
CCTGCCCCACTGACTGTT CGGAAGCACCCGAGGCCACCTACGCCAGATGCGGTT
TGGGCCCTGGCTGACACCTAGGTGTAGGTTCTACCGCTATACCCATATAGGCTCTGGCACTAC
CCCTGC ACTGTCAACTT CACC ATCTCAAGGTTAGGATGTACGTGGGGGGCGTGGAGC
ACAGGTTCGAAGCCGATGCAATTGGACTCGAGGAGAGCGTTGTGACTTGGAGGACA
GGGATAGATCAGAGCTTAGCCGCTGCTGCTGTACAACAGAGTGGCAGATACTGCC
CTGTTCTTCACCACCCCTGCCGCCCTATCCACCGGCCTGATCCACCTCCATCAGAAC
ATCGTGGACGTGCAATACCTGTACGGTGTAGGGTGGCGGTTGTCTCCCTGTCA
AATGGGAGTATGTCTGTTGCTCTCCTCTGGCAGACGCCGCATCTGCGCCTGC
TTATGGATGATGCTGCTGATAGCTCAAGCTGAGGCCGCTTAGAGAACCTGGTGGTCC
TCAATGCCGGCCGTGGCGGGCGCATGGCACTCTTCCCTGTGTTCTTGT
GCTGCCTGGTACATCAAGGGCAGGCTGGTCCCTGGTGC GGCAACGCCTTCTATGGCG
TGTGGCCGCTGCTCTGCTGGCCTTACCAACAGCTTATGCCTAGTAA



Fig. 22

OD measured at 450 nm
construct

Fraction	volume	dilution	39 Type 1b	40 Type 1b	62 Type 3a	63 Type 5a
START	23 ml	1/20	2.517	1.954	1.426	1.142
FLOW THROUGH	23 ml	1/20	0.087	0.085	0.176	0.120
1	0.4 ml	1/200	0.102	0.051	0.048	0.050
2			0.396	0.550	0.090	0.067
3			2.627	2.603	2.481	2.372
4			3	2.967	3	2.694
5			3	2.810	2.640	2.154
6			2.694	2.499	1.359	1.561
7			2.408	2.481	0.347	1.390
8			2.176	1.970	1.624	0.865
9			1.461	1.422	0.887	0.604
10			1.286	0.926	0.543	0.519
11			0.981	0.781	0.294	0.294
12			0.812	0.650	0.249	0.199
13			0.373	0.432	0.239	0.209
14			0.653	0.371	0.145	0.184
15			0.441	0.348	0.151	0.151
16			0.321	0.374	0.098	0.106
17			0.525	0.186	0.099	0.108
18			0.351	0.171	0.083	0.090
19			0.192	0.164	0.084	0.087

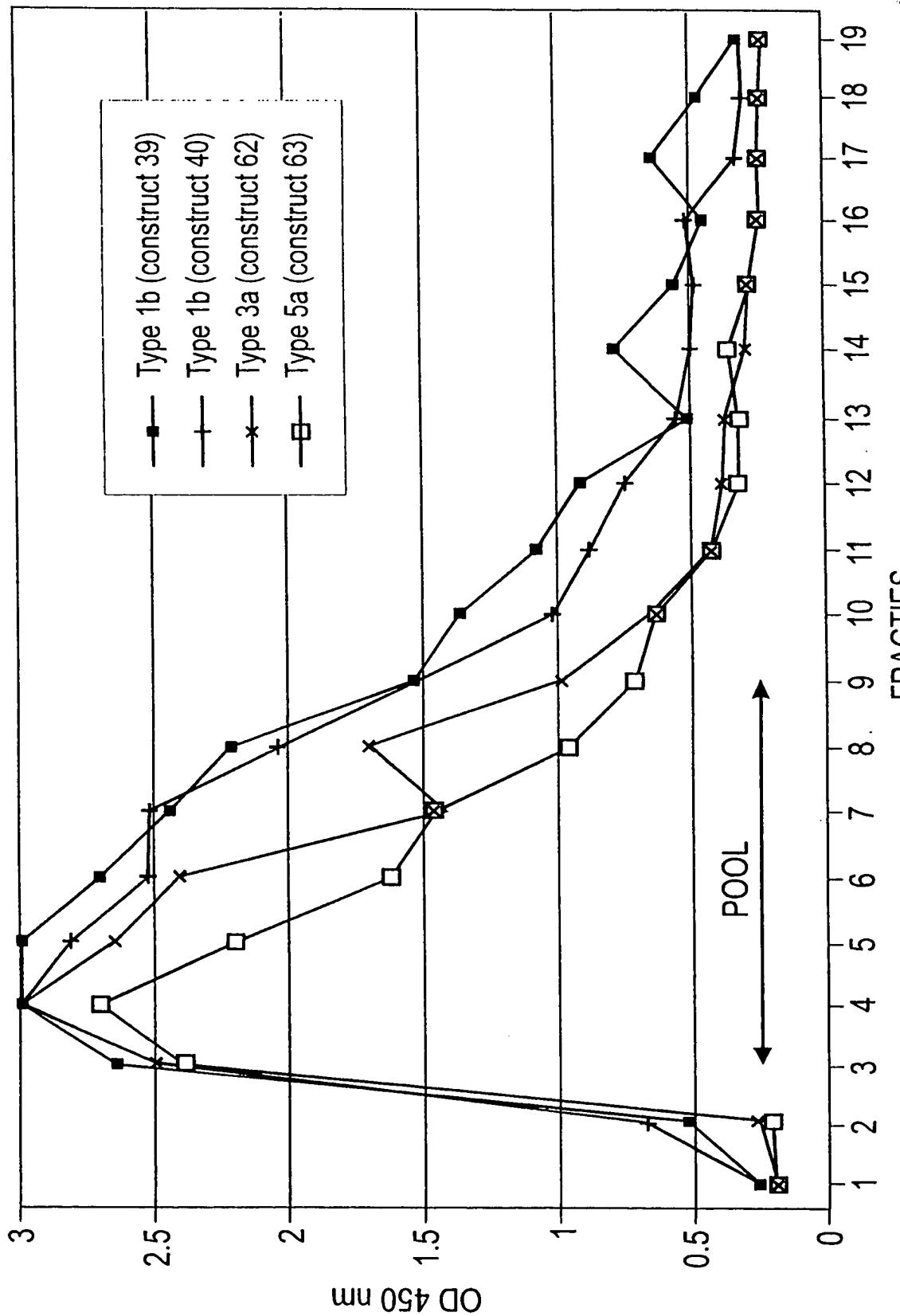


Fig. 23



Fig. 24

Fraction	volume	dilution	OD measured at 450 nm			
			construct			
			39 Type 1b	40 Type 1b	62 Type 3a	63 Type 5a
20	250 μ l	1/200	0.072	0.130	0.096	0.051
21			0.109	0.293	0.084	0.052
22			0.279	0.249	0.172	0.052
23			0.093	0.151	0.297	0.054
24			0.080	0.266	0.438	0.056
25			0.251	0.100	0.457	0.048
26			3	1.649	0.722	0.066
27			3	3	2.528	0.889
28			3	3	3	2.345
29			3	3	2.849	2.580
30			2.227	1.921	1.424	1.333
31			0.263	0.415	0.356	0.162
32			0.071	0.172	0.154	0.064
33			0.103	0.054	0.096	0.057
34			0.045	0.045	0.044	0.051
35			0.043	0.047	0.045	0.046
36			0.045	0.045	0.049	0.040
37			0.045	0.047	0.046	0.048
38			0.046	0.048	0.047	0.057
39			0.045	0.048	0.050	0.057
40			0.046	0.049	0.048	0.049

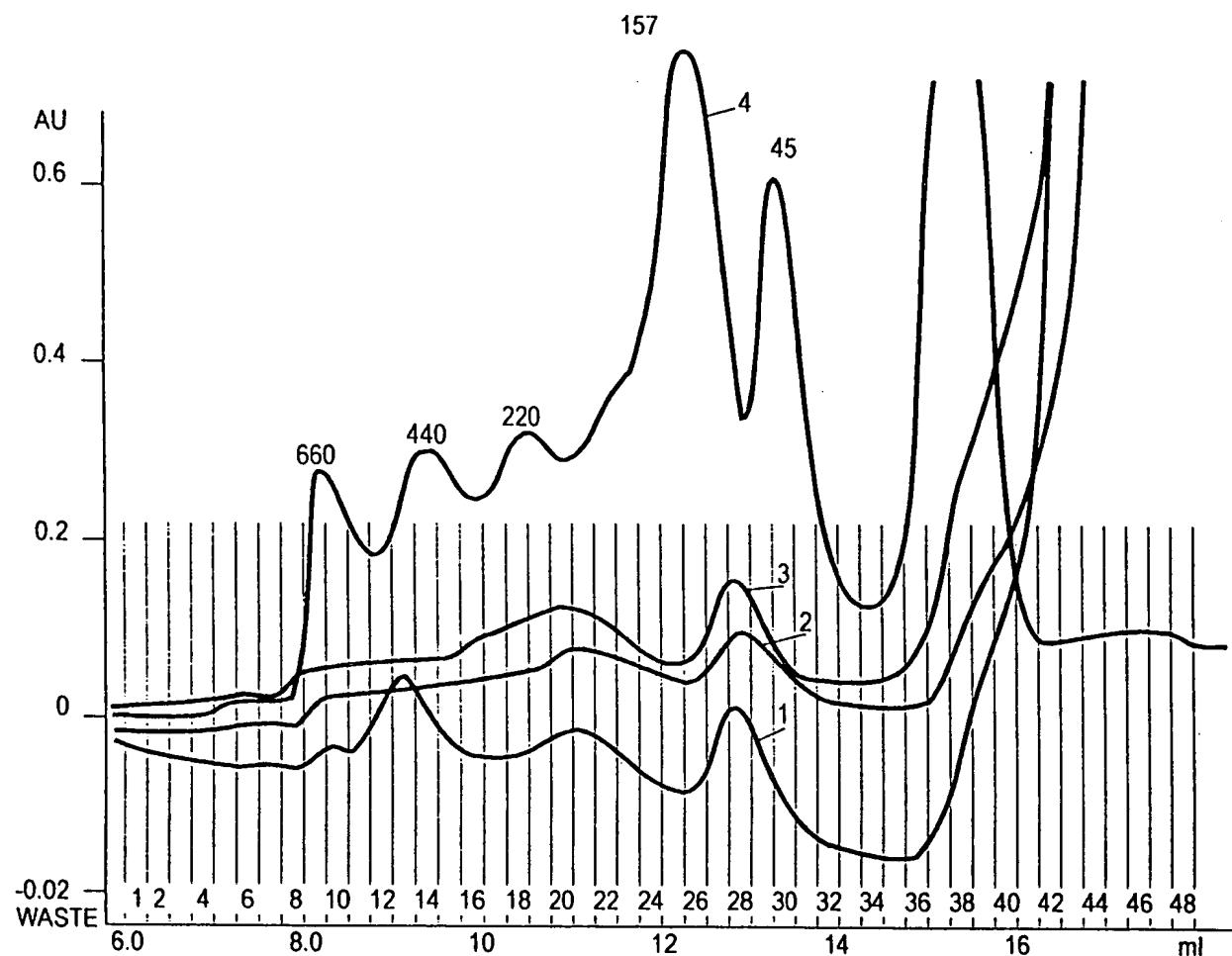


Fig. 25

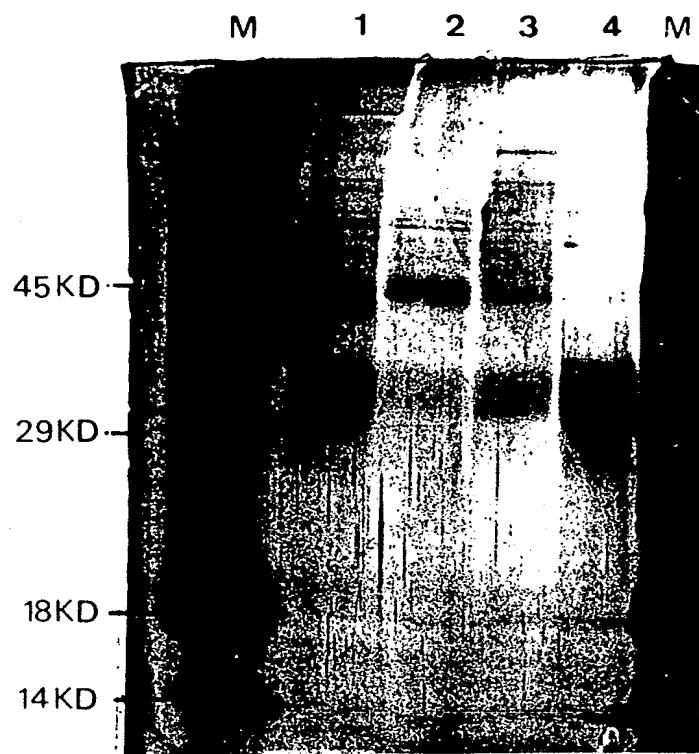


Fig. 26

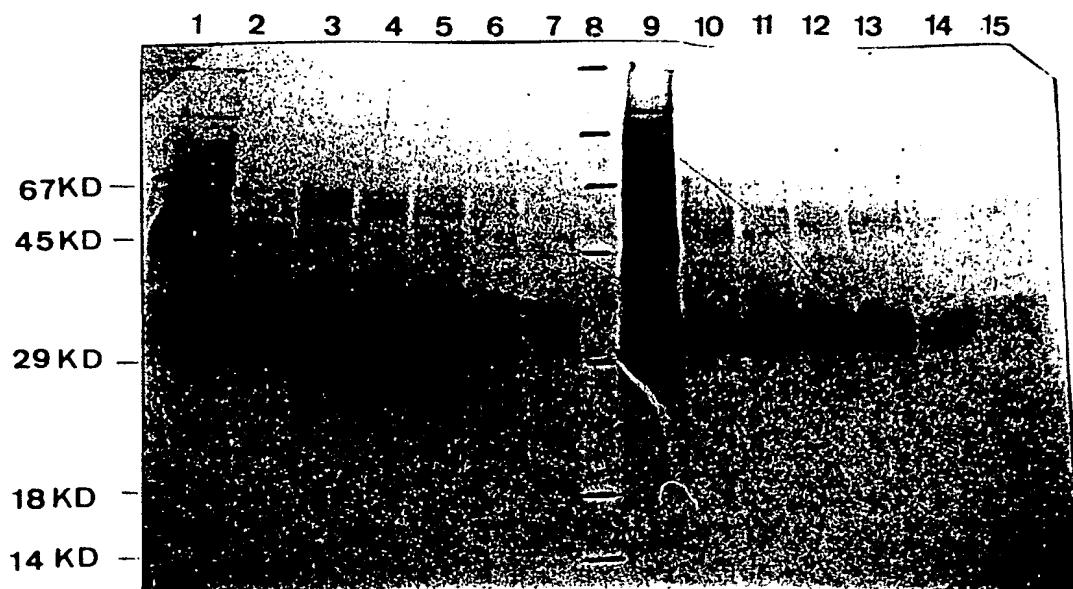


Fig. 27

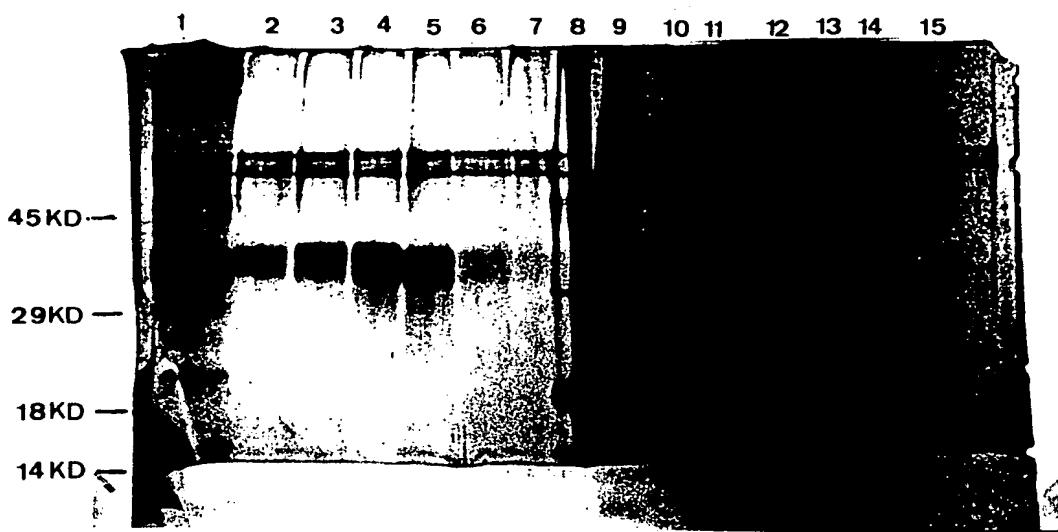
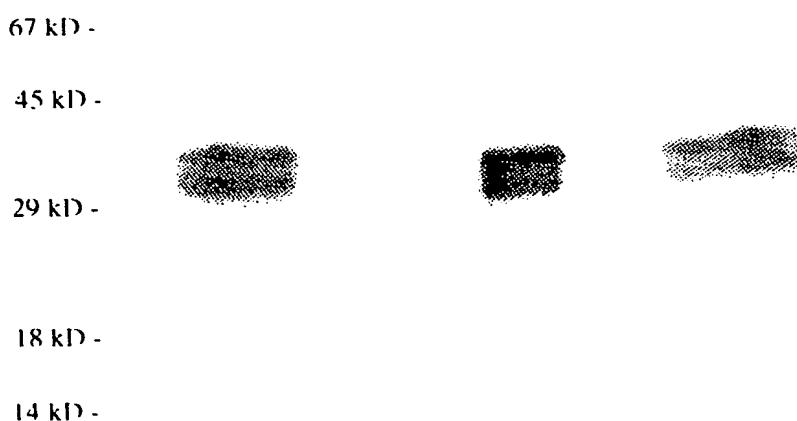


Fig.28

M 1 2 3 4 5 6

Fig.29



- Lane 1: Crude Lysate
- Lane 2: Flow through Lentil Chromatography
- Lane 3: Wash with EMPIGEN Lentil Chromatography
- Lane 4: Eluate Lentil Chromatography
- Lane 5: Flow through during concentration lentil eluate
- Lane 6: Pool of E1 after Size Exclusion Chromatography

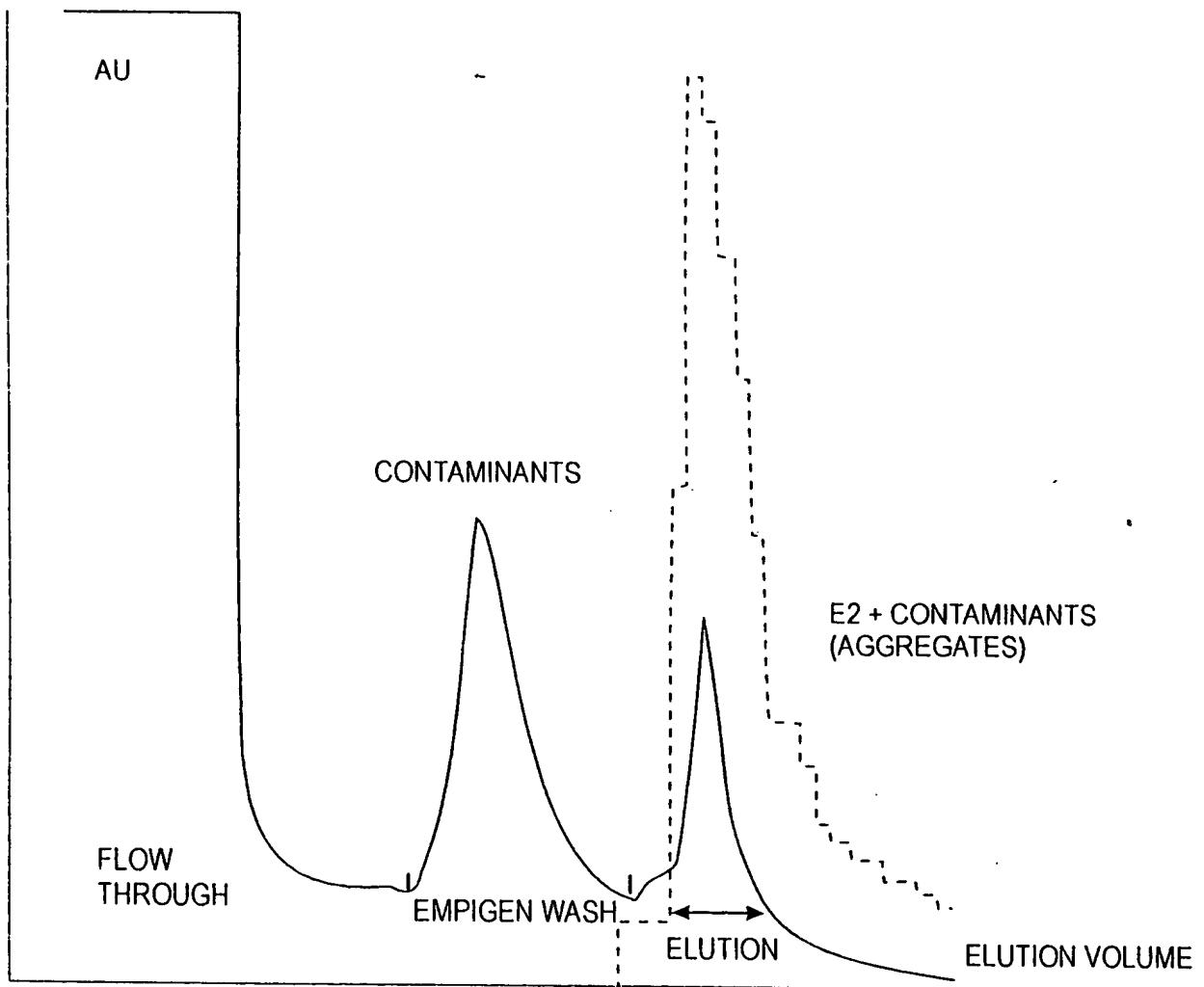


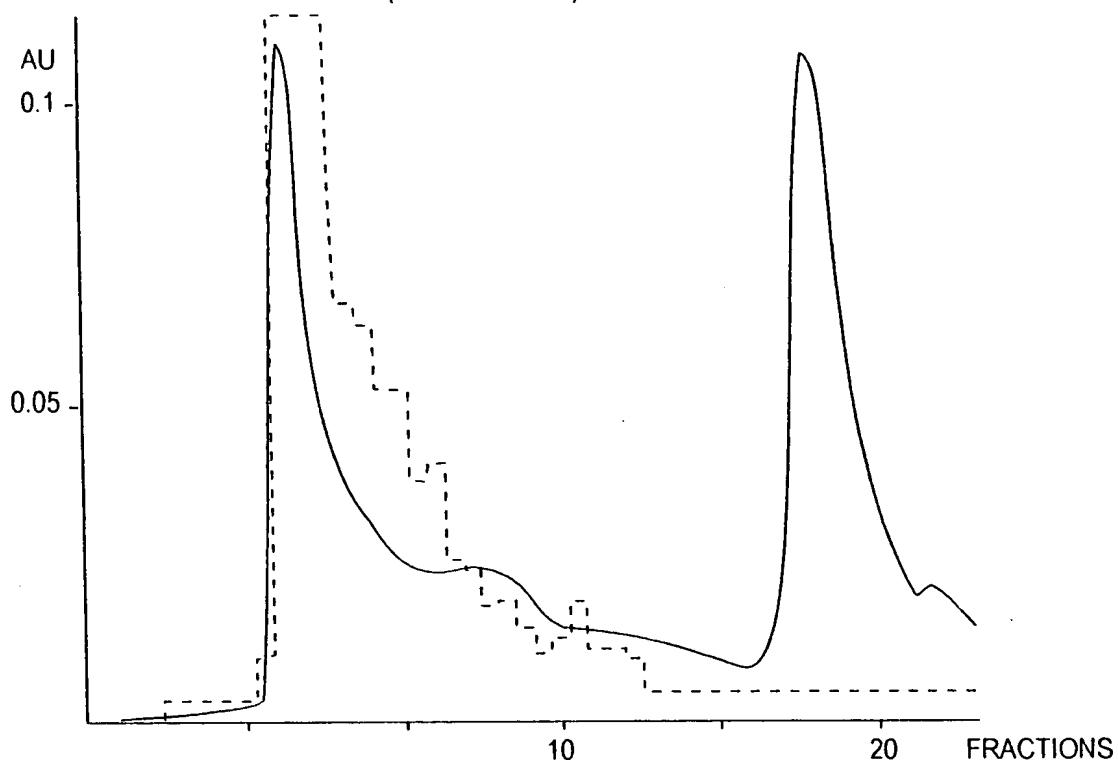
Fig. 30



NON - REDUCED

Fig. 31A

E2 + CONTAMINANTS (AGGREGATES)



REDUCED

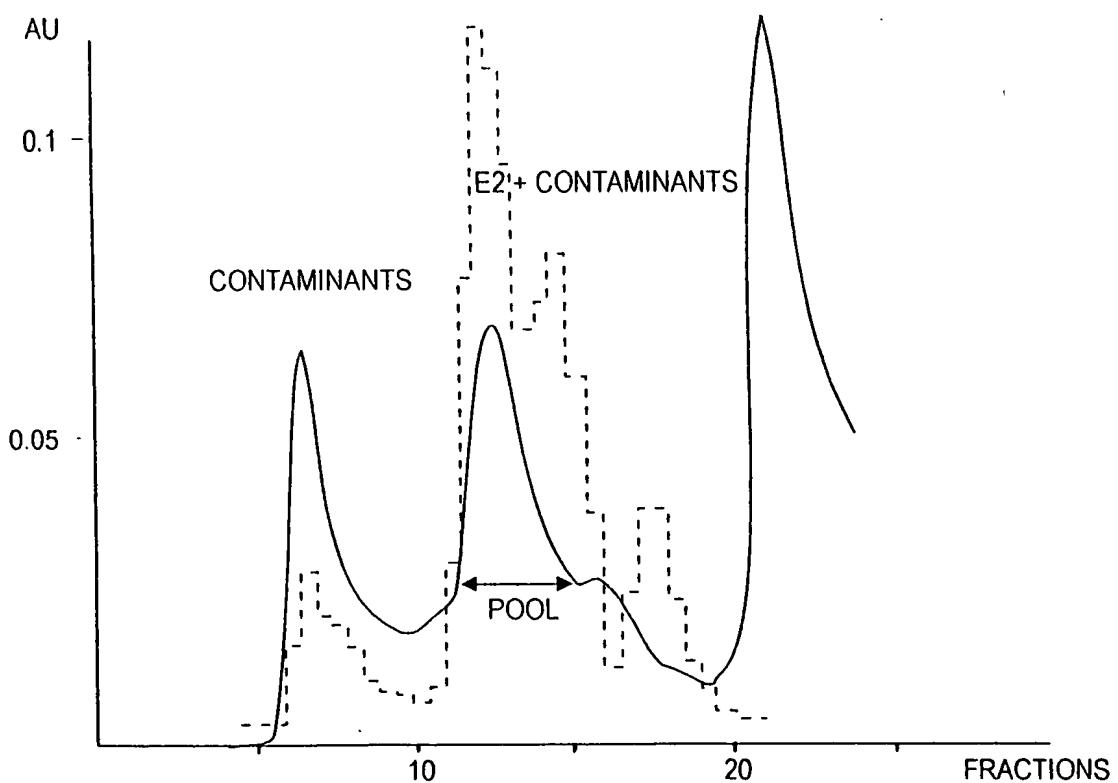


Fig. 31B

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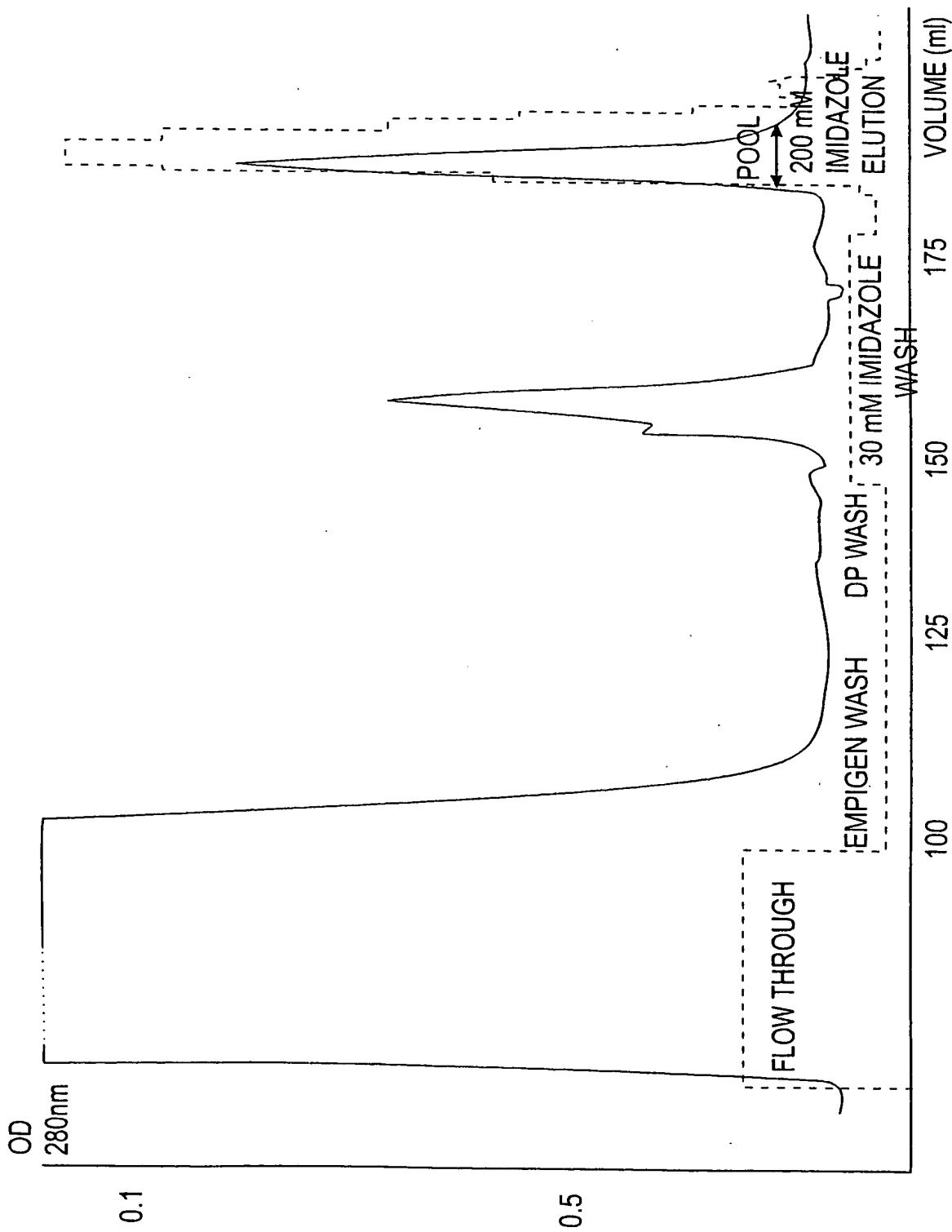
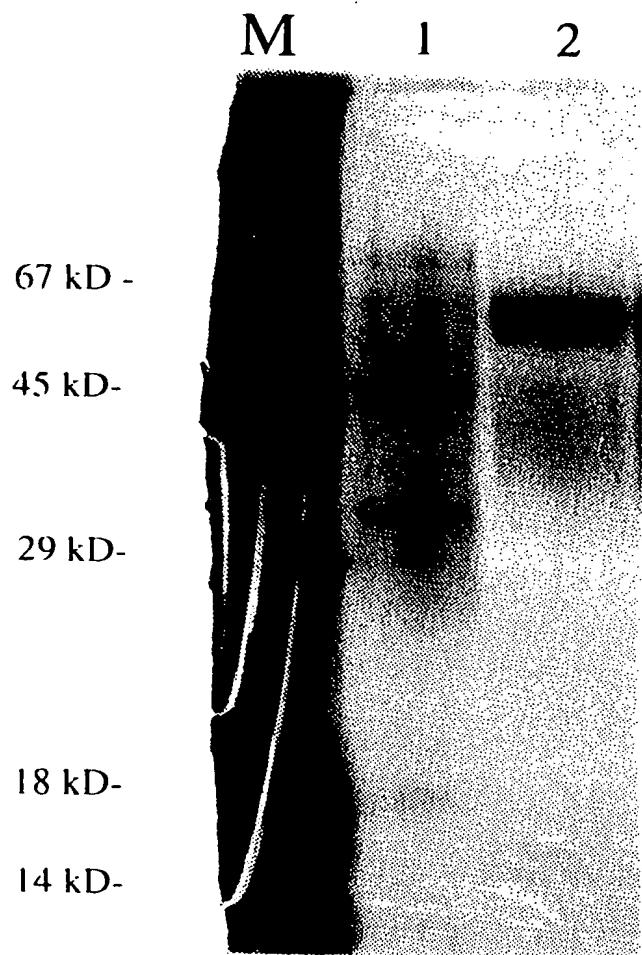


Fig. 32

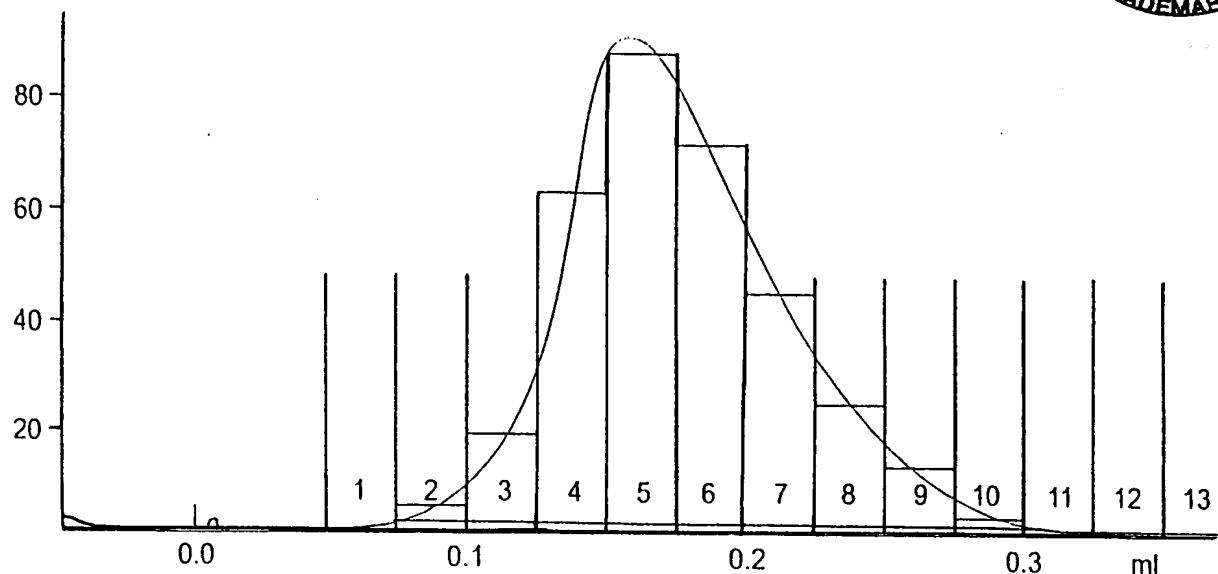


SILVER STAIN OF PURIFIED E2



1. 30 mM IMIDAZOLE WASH Ni-IMAC
2. 0.5 ug E2

Fig.33



No.	Ret. (ml)	Peak start (ml)	Peak end (ml)	Dur (ml)	Area (ml*mAU)	Height (mAU)
1	-0.45	-0.46	-0.43	0.04	0.0976	4.579
2	1.55	0.75	3.26	2.51	796.4167	889.377
3	3.27	3.26	3.31	0.05	0.0067	0.224
4	3.33	3.32	3.33	0.02	0.0002	0.018

Total number of detected peaks = 4
 Total Area above baseline = 0.796522 ml*AU
 Total area in evaluated peaks = 0.796521 ml*AU
 Ratio peak area / total area = 0.999999
 Total peak duration = 2.613583 ml

Fig. 34

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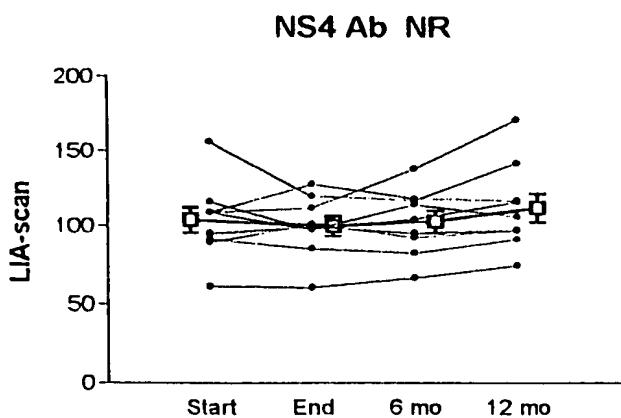


Fig. 35A-1

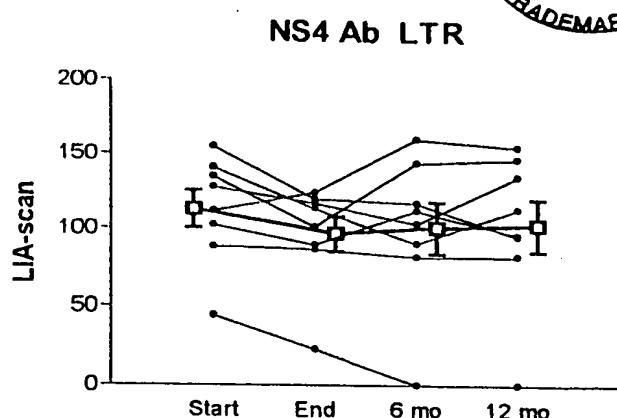


Fig. 35A-2

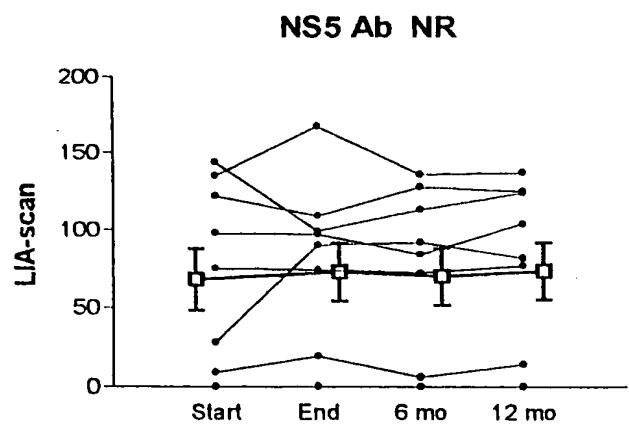


Fig. 35A-3

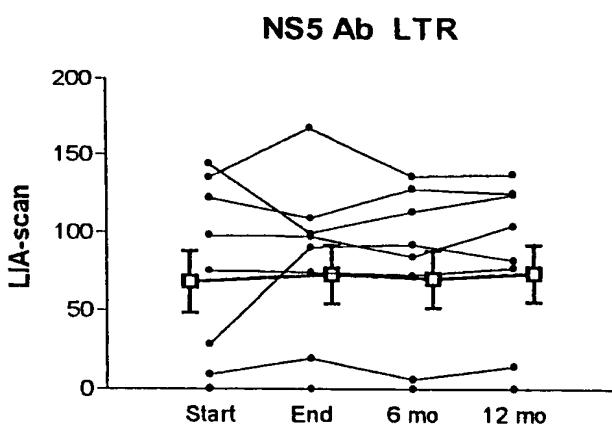


Fig. 35A-4

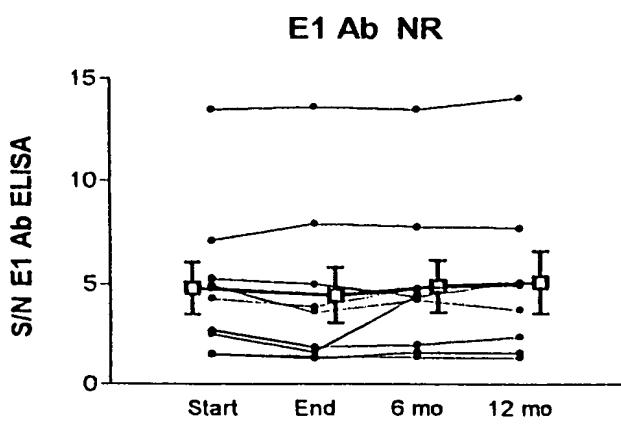


Fig. 35A-5

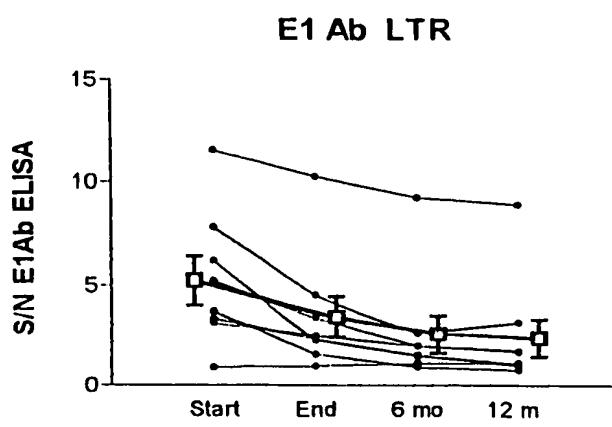


Fig. 35A-6



E2 Ab NR

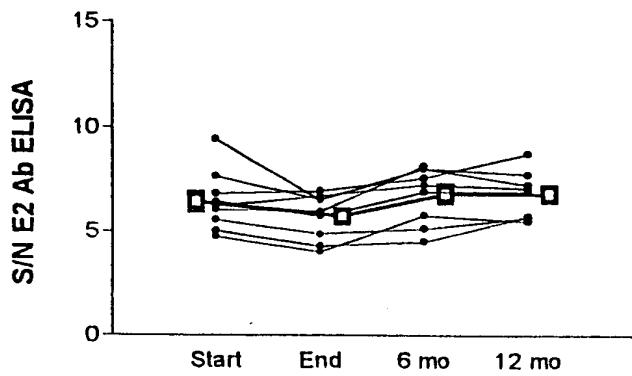


Fig. 35A-7

E2 Ab LTR

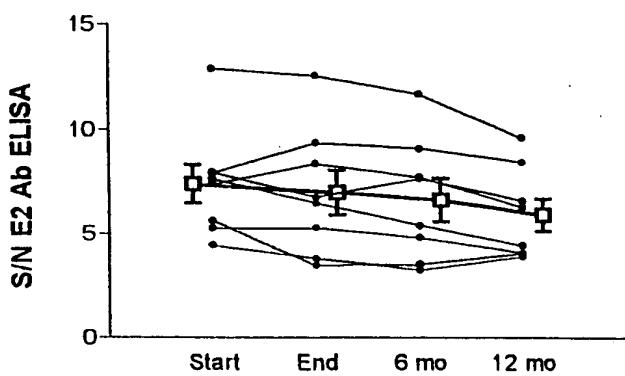


Fig. 35A-8

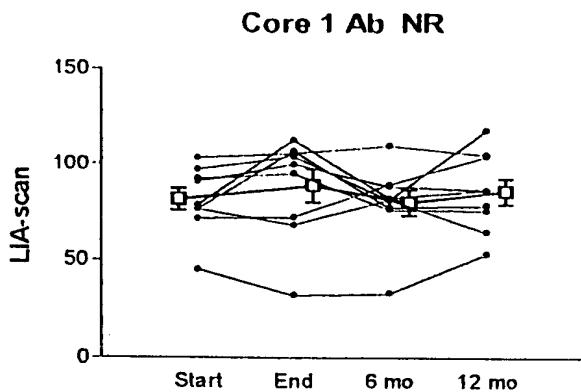


Fig. 35B-1

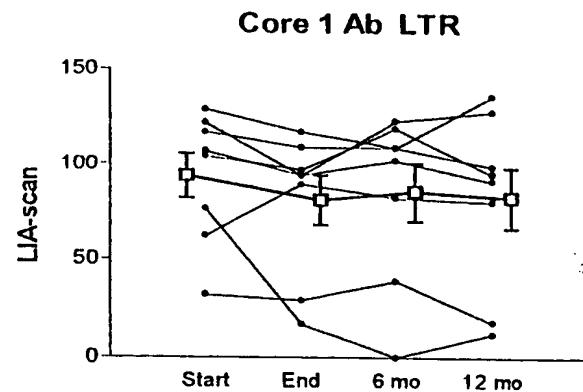


Fig. 35B-2

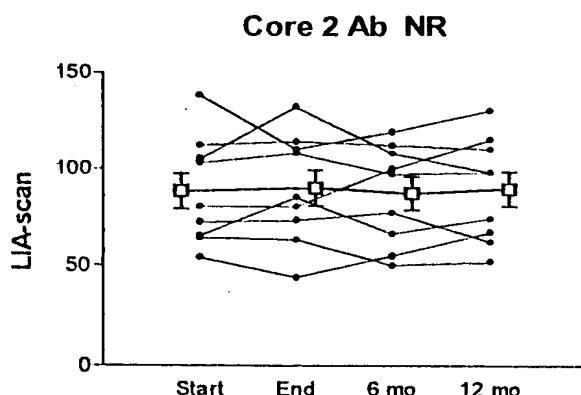


Fig. 35B-3

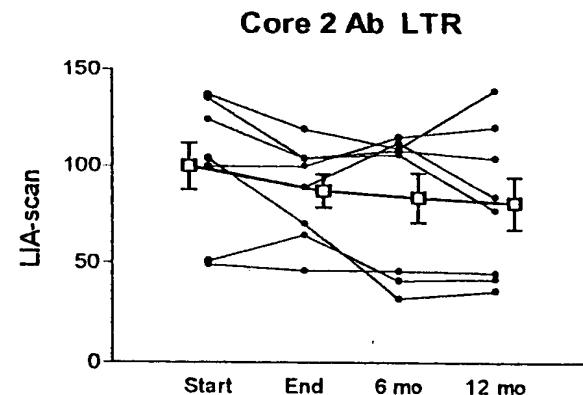


Fig. 35B-4

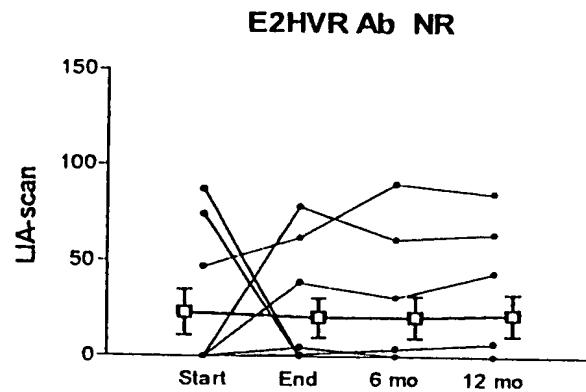


Fig. 35B-5

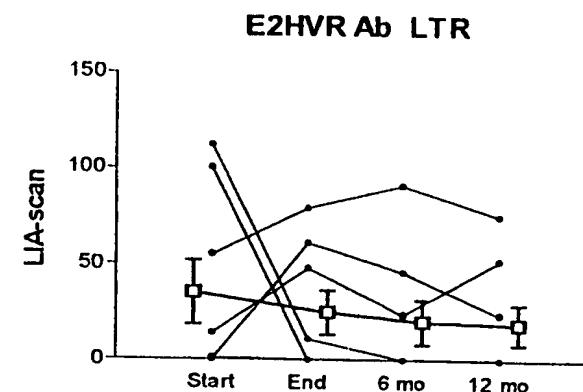


Fig. 35B-6

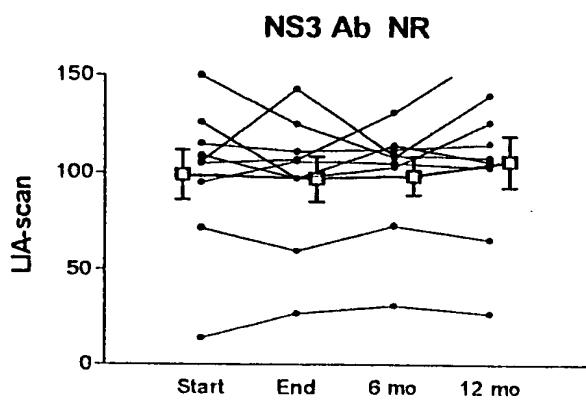


Fig. 35B-7

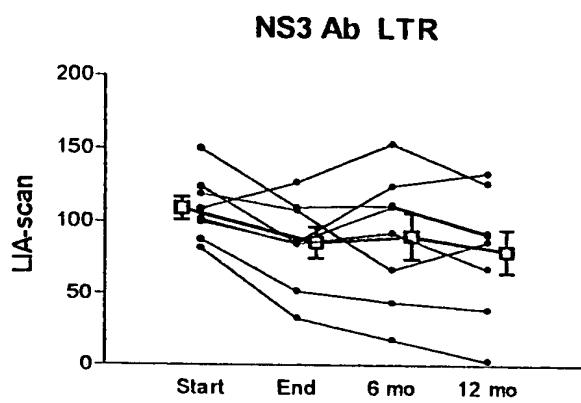


Fig. 35B-8



Fig. 36A

E1 Ab

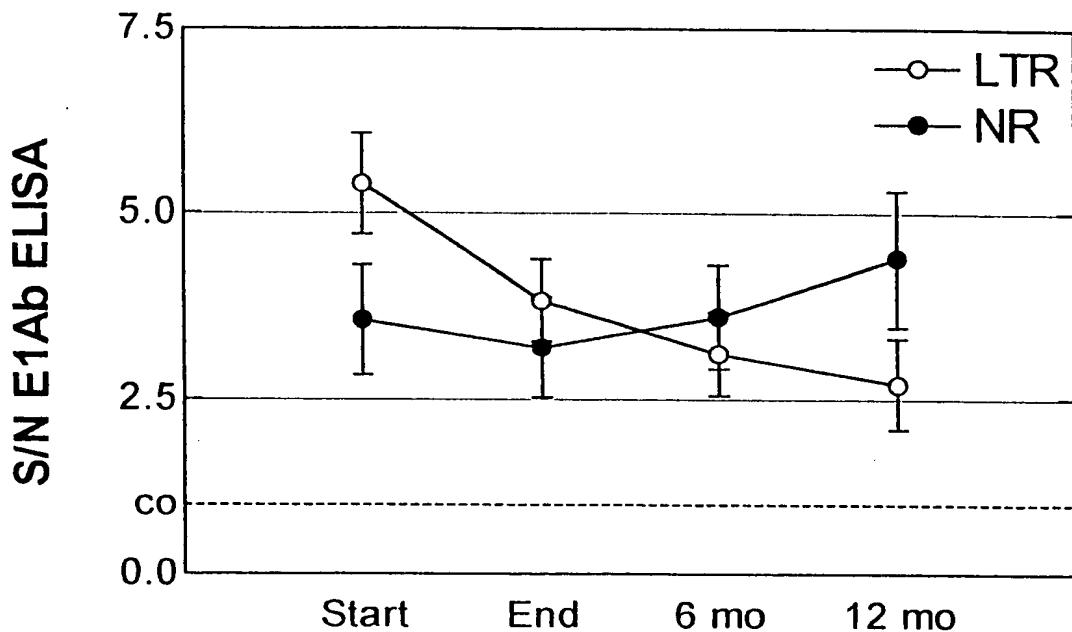


Fig. 36B

E2 Ab

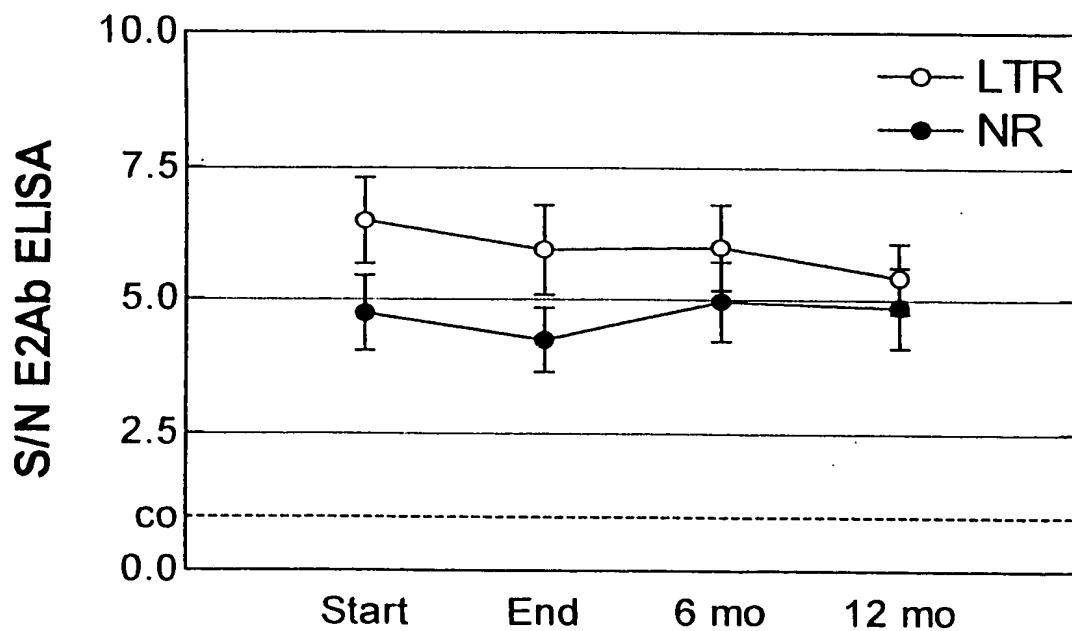


Fig. 37A
Non Responders

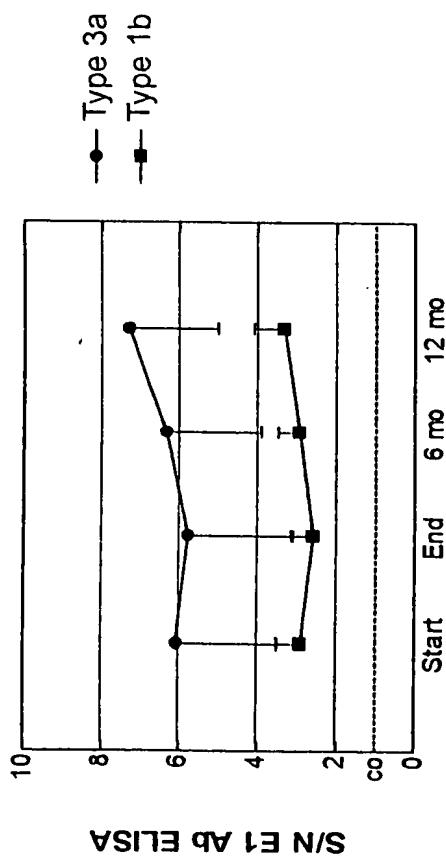


Fig. 37B
Long Term Responders

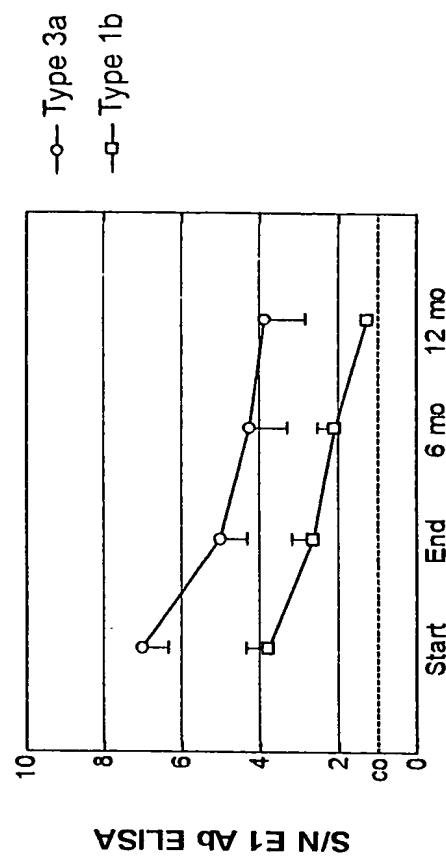


Fig. 37C
Type 1b

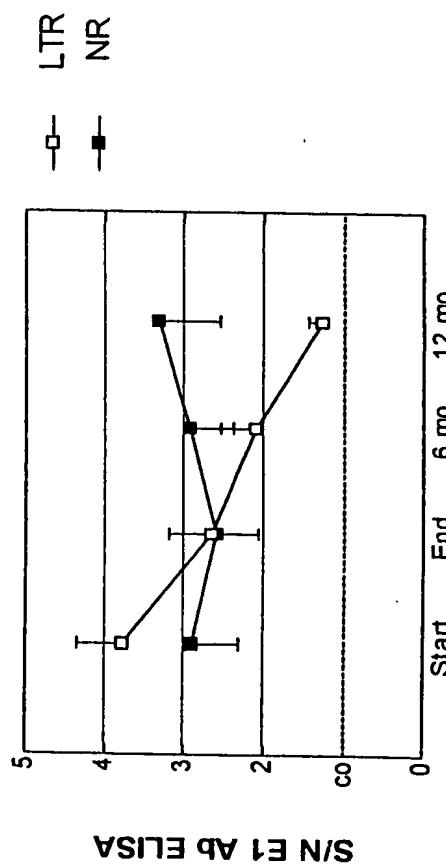


Fig. 37D
Type 3a

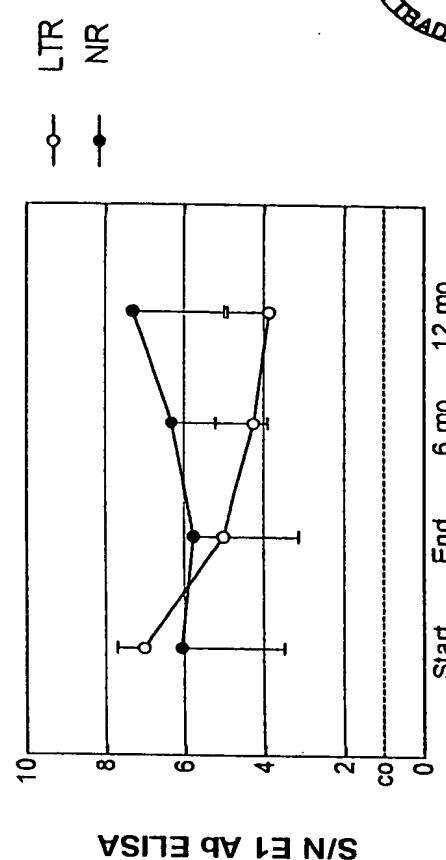
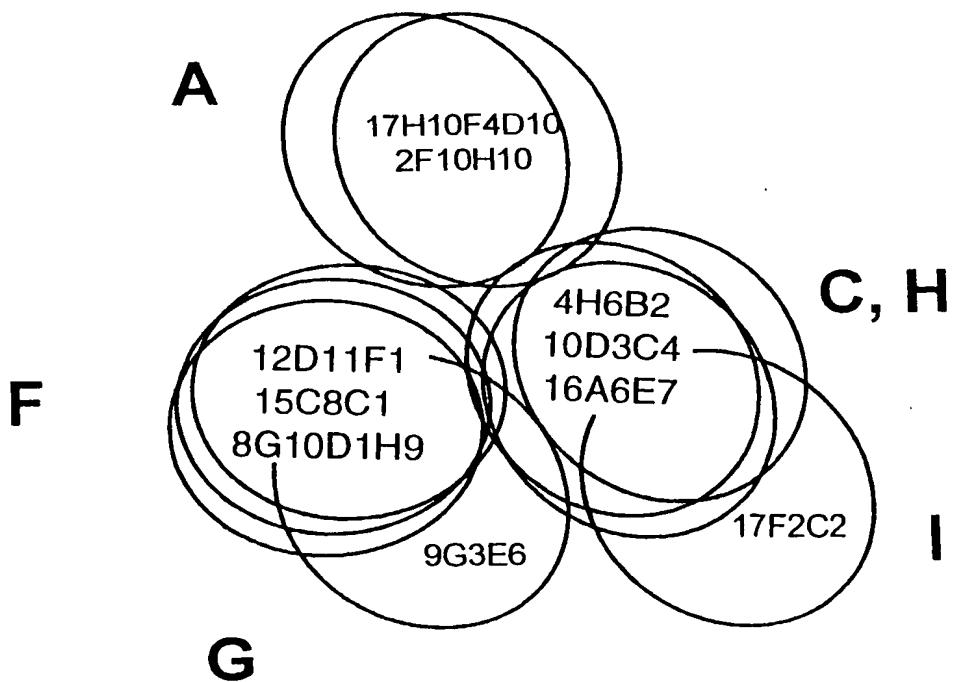




Fig. 38

Relative Map Positions of
anti-E2 monoclonal antibodies





PARTIAL TREATMENT OF HCV E2\E2s ENVELOPE PROTEINS
BY PNGase F

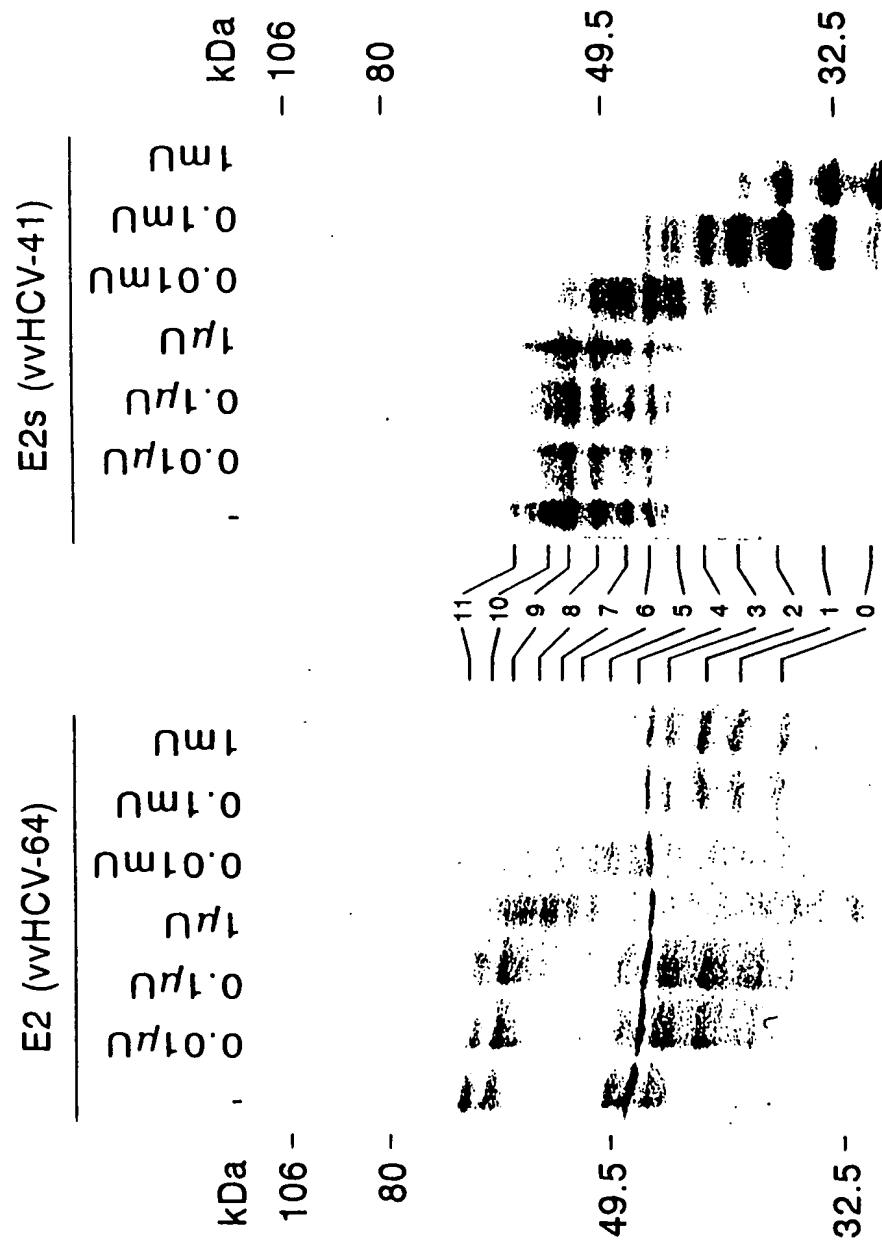


Fig. 40



Fig. 4.1 *In Vitro* Mutagenesis of HCV E1 glycoprotein

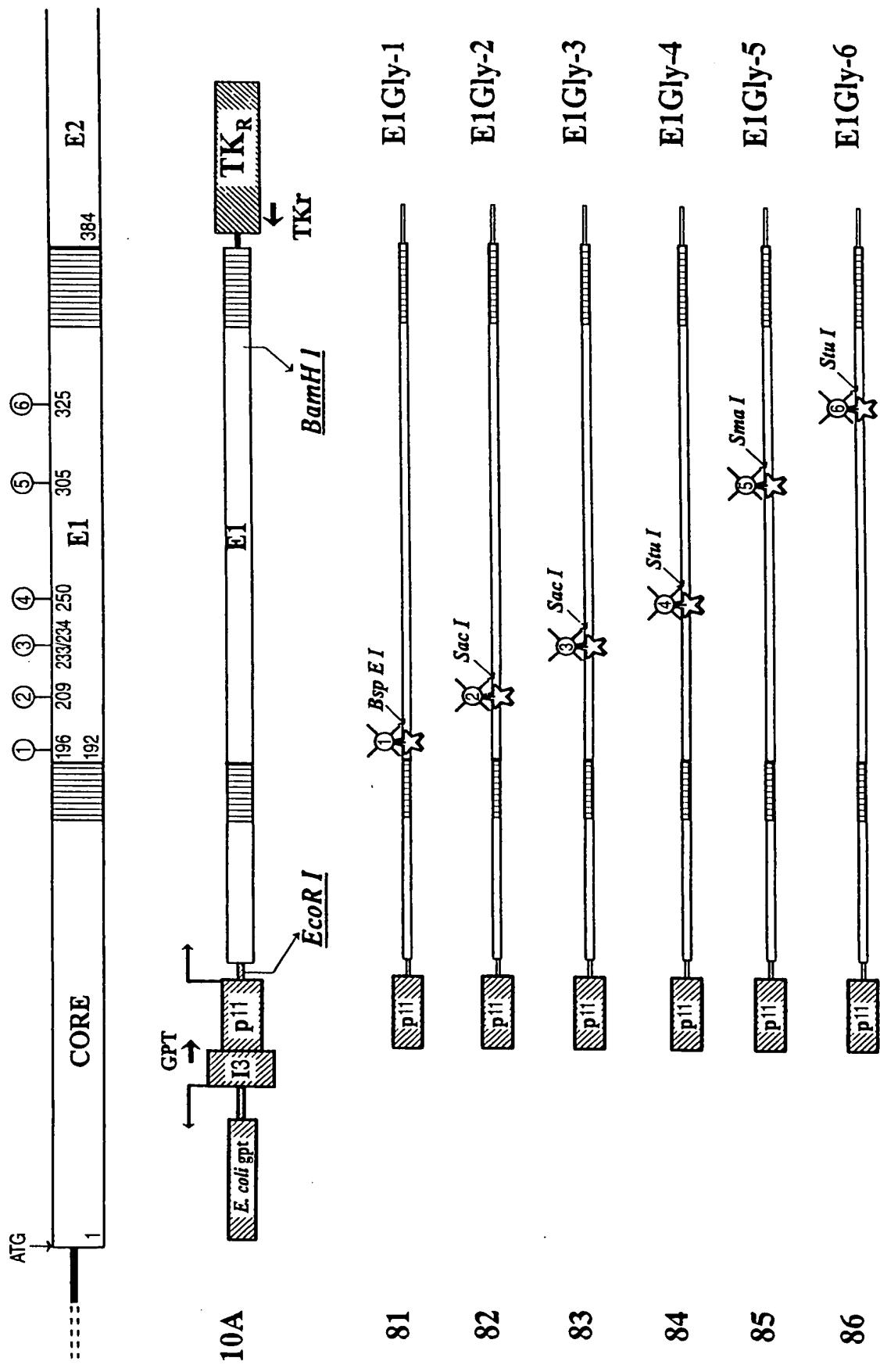
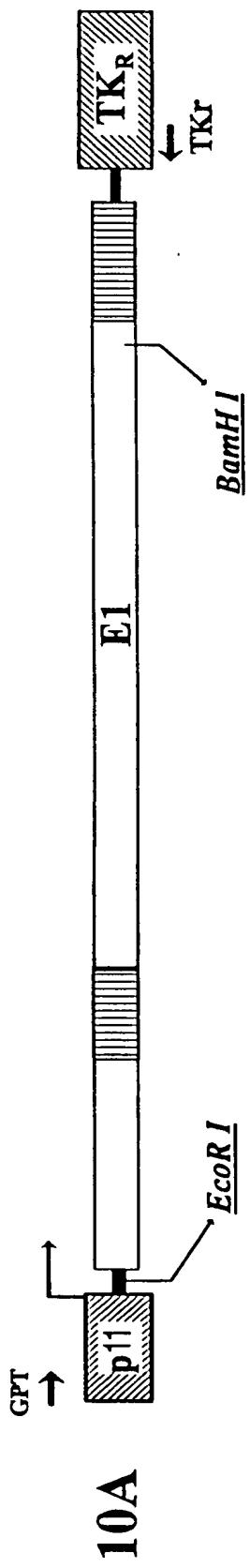
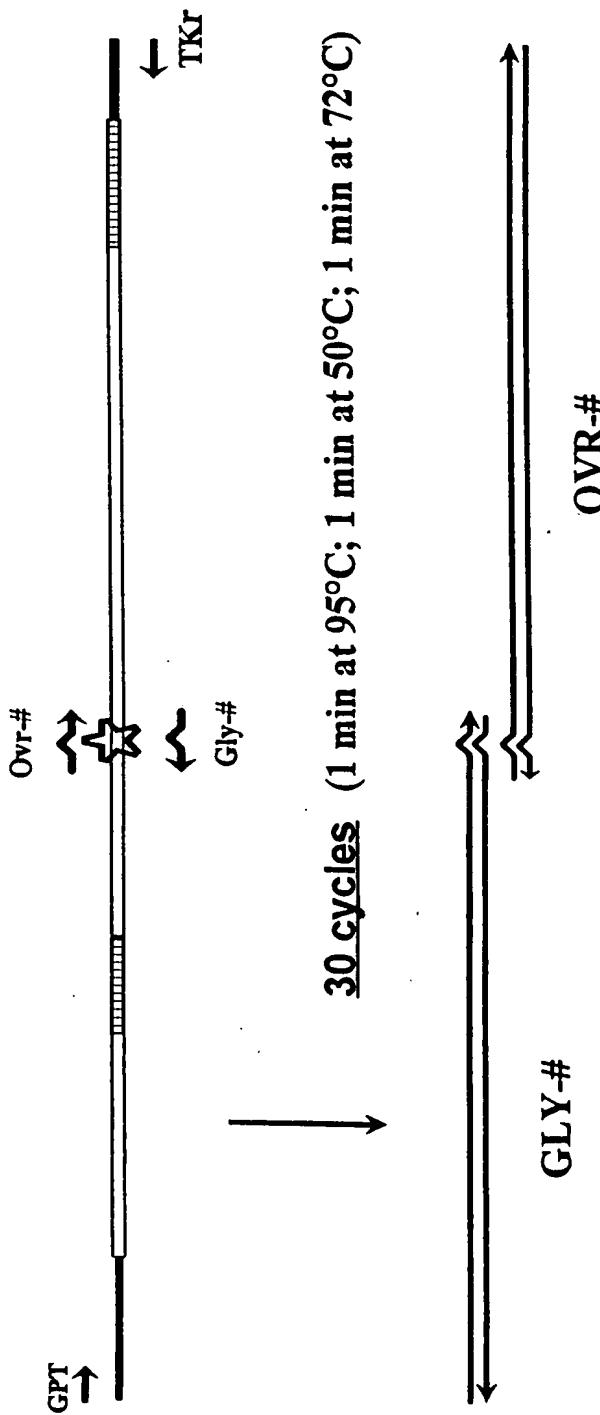




Fig. 42A *In Vitro* Mutagenesis of HCV E1 glycoprotein



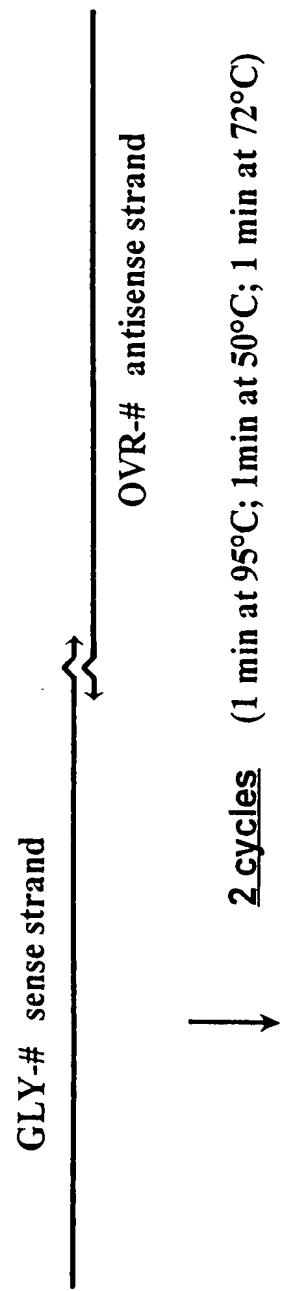
1. First step of PCR amplification (Gly-# and Ovr-# primers)





2. Overlap extension and nested PCR

a. Overlap extension



b. Nested PCR amplification (GPT-2 and TKr-2 primers)

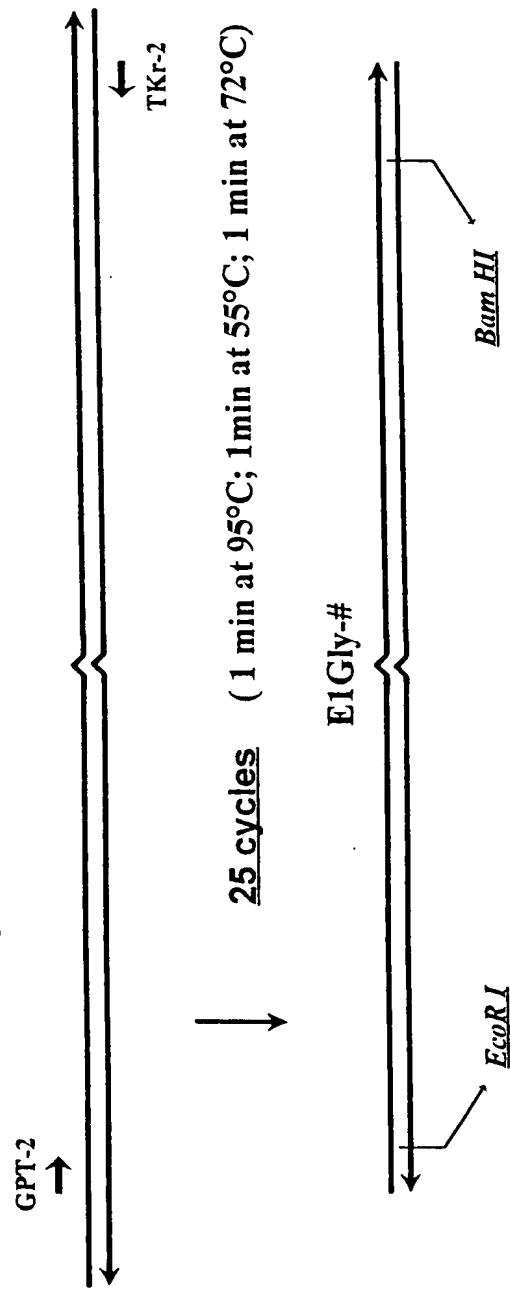
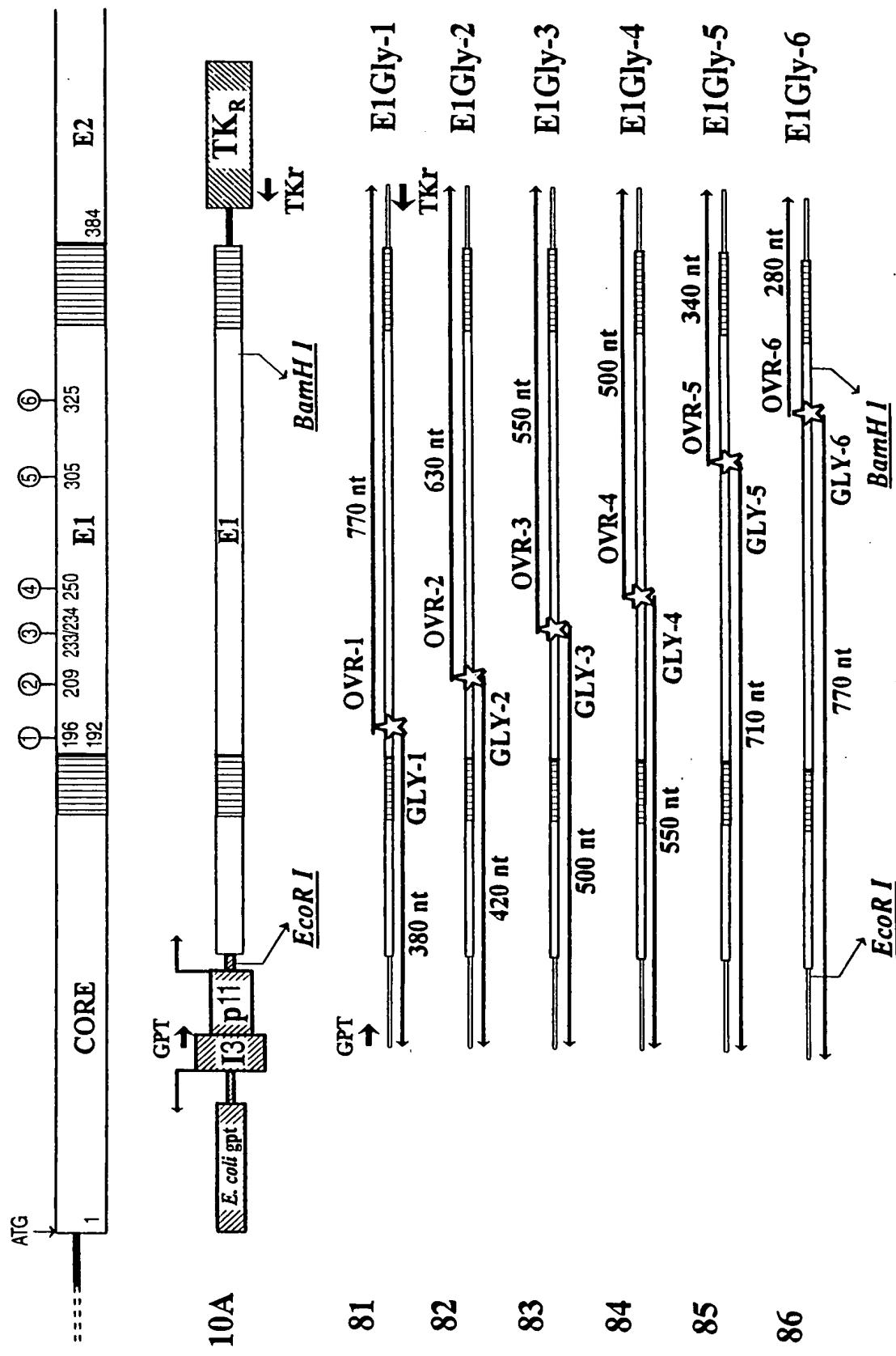


Fig. 42B

Fig. 43 *In Vitro* Mutagenesis of HCV E1 glycoprotein



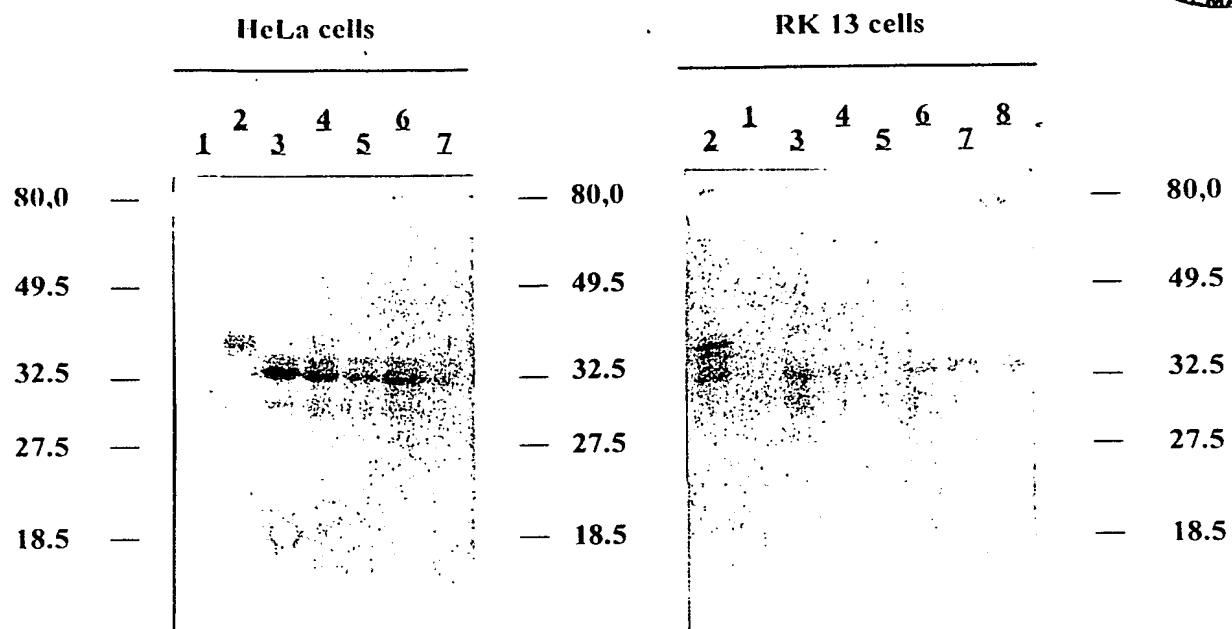


Fig. 44A

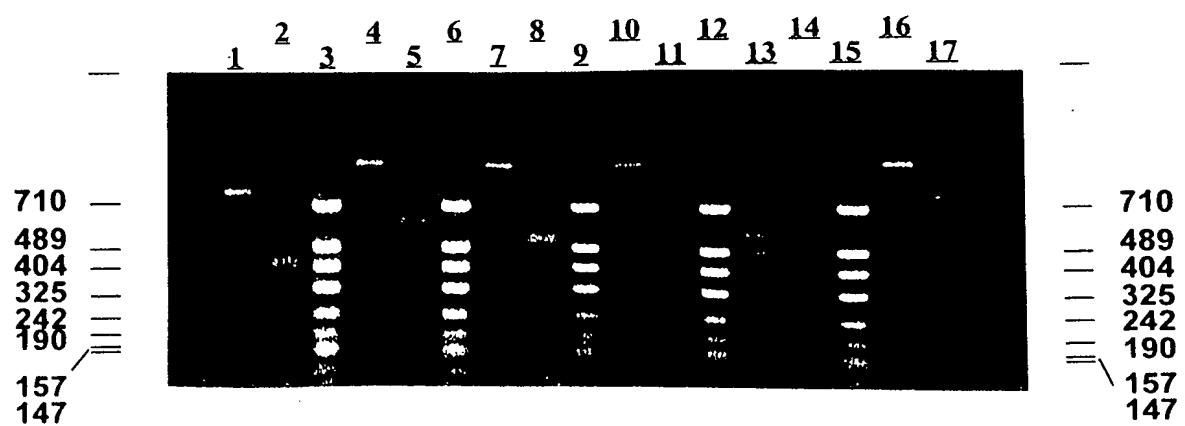


Fig. 44B

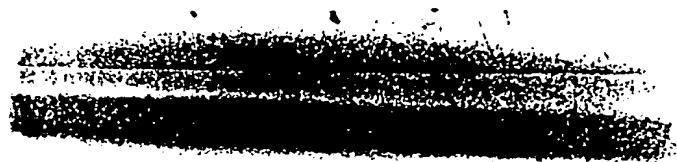


Fig.45

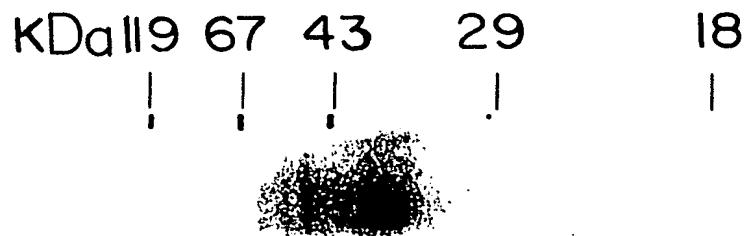


Fig.46